Risk and Protective Factors for Adolescent Drug Use:

Findings from the 1999 National Household Survey on Drug Abuse

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Highlights

This report presents detailed information about risk and protective factors for substance use among youths aged 12 to 17, using data from the 1999 National Household Survey on Drug Abuse (NHSDA). Risk factors include those individual characteristics or social environments associated with an increased likelihood of substance use, while protective factors are related to decreased likelihood of substance use or of nonuse. These analyses update and expand upon a previous report on risk and protective factors for adolescent drug use based on the 1997 NHSDA.

The classification approach used in this report categorizes the set of risk and protective factors into one of four domains based on categories developed by the Social Development Research Group, School of Social Work, University of Washington, in Seattle: community, family, peer/individual, and school. The community domain includes such factors as community disorganization and crime and the availability of illicit drugs. The family domain includes such factors as parental attitudes toward youth substance use and parental communication with youths about the dangers of substance use. The peer/individual domain includes such factors as antisocial behavior and friends' use of licit and illicit drugs. The school domain includes such factors as sanctions against substance use at school and exposure to prevention messages in school. Most of these items were designed for and asked only of the 12 to 17 year olds in the sample and focused on current or past year perceptions or behavior. Findings in this report are grouped by prevention domain where possible.

Chapter 2: Distributions of Risk and Protective Factors for Substance Use

Community Domain

- An estimated 79 percent of youths reported that most neighborhood adults would strongly disapprove if they tried marijuana, 65 percent reported that neighborhood adults would strongly disapprove if they smoked cigarettes daily, and 70 percent reported that neighborhood adults would strongly disapprove if they drank alcohol daily.

- More than one out of four youths (29 percent) reported that they personally knew at least some adults who used marijuana. Nearly half of youths (45 percent) reported that they personally knew at least some adults who got drunk once a week or more.

- Approximately 57 percent of youths reported that marijuana would be fairly or very easy to obtain if they wanted some.

- Among youths, whites reported less community disorganization and crime, and more neighborhood cohesiveness, than other racial/ethnic groups.

- The perceived availability of marijuana was approximately equal among whites, blacks, and Hispanics, but marijuana was perceived to be less available among youths in the "other" category.[1]

Family Domain

- Most youths reported that their parents sometimes or always made them do work/chores around the house (88 percent) and provided help with homework if needed (81 percent); only 39 percent of youths reported that their parents limited the amount of time they could watch television.

- Most youths reported that their parents would strongly disapprove if they tried marijuana once or twice (91 percent), had one or more drinks of alcohol every day (90 percent), or smoked one or two packs of cigarettes a day (87 percent).

- Approximately 57 percent of youths reported that they had spoken with at least one of their parents about the dangers of using tobacco, alcohol, or illicit drugs in the past 12 months.

- Among youths, whites (60 percent) and Hispanics (58 percent) were more likely to report parental communication about the dangers of substance use compared with blacks (47 percent) or youths in the "other" category (51 percent).

Peer/Individual Domain

- Among youths, 22 percent had gotten into a serious fight at school or work at least once in the past year, 17 percent had taken part in a group-on-group fight at least once in the past year, and 8 percent had attacked someone with the intent of seriously injuring him or her at least once in the past year.

- Nearly two out of three youths (64 percent) reported that they would strongly disapprove of same-aged youths trying marijuana once or twice.

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[1] Non-Hispanic whites and non-Hispanic blacks are referred to as "whites" and "blacks" in this report. "Other" indicates those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, and Native Hawaiians or other Pacific Islanders).

- Nearly two out of three youths reported that their friends would strongly disapprove if they were to try marijuana once or twice (63 percent), drink alcohol daily (60 percent), or smoke cigarettes daily (58 percent).

- Among youths, 42 percent reported that at least a few of their friends used marijuana, and 12 percent reported that most or all of their friends were marijuana users. Nearly 1 out of 5 youths (19 percent) reported that most or all of their friends used cigarettes, nearly 1 out of 4 youths (23 percent) reported that most or all of their friends used alcohol, and nearly 1 out of 10 youths (9 percent) reported that most or all of their friends got drunk at least once a week.

- Among youths, 57 percent reported that there would be great risks from using marijuana once or twice a week, and 37 percent reported there would be great risk from using marijuana once a month.

- Among youths, 80 percent somewhat or strongly agreed that their religious beliefs were a very important part of their life, 73 percent agreed that religious beliefs influenced how they made decisions in their life, and 37 percent agreed that it was important that their friends shared their religious beliefs.

- Compared with females, male youths reported less perceived risk from substance use, higher risk-taking proclivity, friends with more positive attitudes toward substance use, and a reduced likelihood of participation in two or more extracurricular events in the past year.

- Compared with youths aged 12 to 14, youths aged 15 to 17 reported notably higher positive attitudes toward substance use, higher positive attitudes toward substance use among their close friends, higher substance use among their friends, lower perceived risk of marijuana use, and less participation in extracurricular activities.

School Domain

- Most youths reported that they would be in a lot of trouble at school if they were caught using an illegal drug (95 percent), alcohol (86 percent), or cigarettes (63 percent).

- Nearly one out of four youths (23 percent) reported that most or all of the students in their grade at school used marijuana.

- Approximately 77 percent of youths reported that they had been exposed to at least one type of prevention message in school.

- White youths reported lower commitment to school compared with other racial/ethnic groups.

- Among youths, whites and youths in the "other" category were less likely to have received grades of "C" or below in the past semester compared with blacks or Hispanics. In addition, males were more likely than females to have received grades of "C" or below.

Chapter 3: Associations Between Risk and Protective Factors and Past Year Marijuana Use

There were strong associations between most of the risk and protective factors and past year marijuana use. Even after adjusting for differences due to gender, race/ethnicity, household income, number of parents in the household, county size, and geographic region, most of the risk and protective factors still displayed the expected association with past year marijuana use.

Community Domain

- Youths who reported that adults in their neighborhood would strongly disapprove if they were to try marijuana once or twice were less likely to have used marijuana in the past year (11 percent) compared with youths who responded that neighborhood adults would either somewhat disapprove or neither approve nor disapprove (28 percent) of that behavior.

- Youths who reported that most or all of the adults they personally knew used marijuana were more likely to have used marijuana in the past year (46 percent) compared with youths who knew few adult marijuana users (33 percent) or no adult marijuana users (6 percent).

- Youths who reported that marijuana would be fairly easy or very easy to obtain were more likely to have used marijuana in the past year (30 percent) compared with youths who reported that marijuana would be fairly difficult, very difficult, or impossible to obtain (24 percent).

- Youths who had been exposed to prevention messages in the media were less likely to have used marijuana in the past year (13 percent) compared with youths who had not been exposed to these types of messages (18 percent).

Family Domain

- Youths were 4 times more likely to have used marijuana in the past year if they believed their parents would only somewhat disapprove or neither approve nor disapprove if they used marijuana (42 percent) compared with

youths who believed their parents would strongly disapprove of their marijuana use (11 percent).

- Youths who selected one of their parents as the person they would talk with if they had a serious problem were less likely to have smoked marijuana in the past year (11 percent) compared with youths who selected someone other than their parents (23 percent).

Peer/Individual Domain

- Youths who reported that they would somewhat disapprove or neither approve nor disapprove of marijuana use by someone their age were 8 times more likely to have used marijuana in the past year (32 percent) compared with youths who reported that they would strongly disapprove of youth marijuana use (4 percent). Similarly, youths who reported that their friends would somewhat disapprove or neither approve nor disapprove of a youth using marijuana were 8 times more likely to have used marijuana in the past year (32 percent) compared with youths who reported that their friends would strongly disapprove of a youth using marijuana (4 percent).

- Youths who reported that most or all of their friends used marijuana were 3 times more likely to have used marijuana in the past year (59 percent) compared with youths who reported that few of their friends used marijuana (20 percent), and they were 30 times more likely to have used marijuana in the past year compared with youths who reported that none of their friends used marijuana (2 percent).

- Youths who reported low religiosity were more than 4 times more likely to have used marijuana in the past year (23 percent) compared with youths who reported high religiosity (5 percent).

School Domain

- Youths who reported that most or all of the students in their grade at school used marijuana were 3 times more likely to be past year marijuana users (41 percent) compared with youths who reported that few of the students in their grade at school used marijuana (12 percent), and they were 20 times more likely to have used marijuana in the past year compared with youths who reported that none of the students in their grade at school used marijuana (2 percent).

- Youths who reported high commitment to school were less likely to have used marijuana in the past year (9 percent) compared with youths who reported low commitment to school (24 percent).

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Associations with Marijuana Use, by Race/Ethnicity and Gender

Even though the risk and protective factors displayed the expected associations with past year marijuana use after adjusting for differences in age, race/ethnicity, and gender, the strength of the associations between some of the risk and protective factors and past year marijuana use varied by these characteristics.

- Exposure to prevention messages in the media was significantly associated with lower odds of past year marijuana use for whites and Hispanics, but not for blacks or youths in the "other" category.

- Higher levels of parental communication about substance use were significantly associated with lower odds of past year marijuana use among Hispanic youths, but not among youths of other racial/ethnic groups.

- Within the school domain, strong sanctions against illegal drug use were significantly associated with lower odds of past year youth marijuana use among whites, Hispanics, and youths in the "other" category, but not for blacks.

- Exposure to prevention messages in school was associated with lower odds of past year marijuana use for whites and Hispanics, but not for blacks or youths in the "other" category.

- The associations between the risk and protective factors and past year marijuana use were similar for males and females for all of the factors.

Chapter 4: Prediction of Past Year Substance Use Using Multiple Regression Models

The associations presented in this chapter were determined using multiple regression models that adjusted for demographic variables as well as for other risk and protective factors. In addition, this chapter addresses the usefulness of hierarchical modeling techniques in explaining variation in past year marijuana use.

- After controlling for demographic and other risk and protective factors, the peer/individual domain had the most factors significantly associated with past year marijuana use. The factors with the strongest associations with marijuana use were antisocial behavior, having friends who used marijuana, perception of risks from marijuana use, and individual attitudes toward marijuana use.

- Relatively speaking, risk and protective factors were better predictors of substance use than were demographic variables, such as gender and

race/ethnicity. For example, demographic factors accounted for only 15 percent of the variation in past year marijuana use by themselves, while peer/individual domain factors accounted for 51 percent of the variation by themselves. The combination of the demographic factors with the peer/individual risk factors explained a total of 53 percent of the variation in past year marijuana use.

- The risk and protective factors studied across all four domains explained a significant amount of the total variation in individual substance use. For example, together with demographic factors, they explained 56 percent of the variation in past year marijuana use.

- The risk and protective factors and demographic variables included in this survey accounted for more of the variation in past year use of marijuana (56 percent) than for past year use of alcohol (46 percent) or cigarettes (43 percent).

- Hierarchical models indicated that most of the total variation in the past year use of marijuana among youths aged 12 to 17 occurred at the person level (78 percent), while another 16 percent was present at the family level and 6 percent at the neighborhood level.

Chapter 5: Change in Risk and Protective Factors Between 1997 and 1999

- Among the 11 items relevant to risk and protective factors that were comparable between the 1997 NHSDA and the 1999 NHSDA, 4 items showed small but statistically significant differences in distributions between the 2 years.[2] Once the response options for these risk and protective factors were dichotomized so that the direction of the change between 1997 and 1999 could be easily determined, none of these factors showed significant differences in distributions between the 2 years.

- When looking at each factor separately, there was little overall change between 1997 and 1999 in the associations between the risk and protective factors and past year marijuana use. One exception was that the association between past year marijuana use and being approached by a drug seller in the past month was less strong in 1999 than in 1997.

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[2] Comparisons between the 1997 and the 1999 NHSDAs were limited to factors included in both years of the survey that were measured using identical questions. The 1999 NHSDA paper-and-pencil interviewing (PAPI) data, adjusted for field interview experience, were used for comparisons with data from the 1997 NHSDA. For more information, see Chapter 5 of this report.

- When looking at each domain separately, the peer/individual domain explained the most variation in past year marijuana use in both 1997 (55 percent) and 1999 (53 percent).[3] The community domain explained more variation in 1997 (44 percent) than in 1999 (34 percent), as did the family domain (34 percent in 1997 vs. 25 percent in 1999). The expanded school domain in 1999 explained more variation than in 1997 (32 vs. 18 percent). Despite these differences between the 2 years, the relative ranking of the domains as measured by their explanatory power was similar in 1997 and 1999. The peer/individual domain explained the most variance, followed by the community domain. The family domain accounted for more variance than the school domain in 1997, but this order was reversed in 1999.

- Given the decrease in youth prevalence rates for marijuana between 1997 and 1999, the analysis suggests that most of this decrease between these 2 years was due to different levels of association between risk and protective factors and marijuana use in 1999 than in 1997. In particular, most of the change was the result of weaker associations of risk factors, and stronger associations of protective factors, with marijuana use. The distributions (or prevalence levels) of the risk and protective factors remained fairly constant over the period.

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[3] Because the analyses are based on separate logistic regression models for each domain, summing the explained variation for each domain would add to more than 100 percent.

Chapter 1. Introduction

1.1 Overview

Risk and protective factors refer to variables in youths' neighborhoods, families, school, and peer groups, as well as to factors within the individual, that increase or decrease the likelihood of problem behaviors (Catalano, Hawkins, Berglund, Pollard, & Arthur, 2002). Risk factors for substance use (e.g., high rates of substance use among peers) typically are associated with an increased likelihood of substance use, whereas protective factors for substance use (e.g., communication with parents about the dangers of substance use) are related to a decreased likelihood of substance use. Addressing both risk and protective factors in substance use prevention programs is believed to be an important determinant of program success (Center for Substance Abuse Prevention [CSAP], 2001).

This report presents data from the 1999 National Household Survey on Drug Abuse (NHSDA) relating to several aspects of risk and protective factors for substance use among youths aged 12 to 17. These include the following:

- distribution of risk and protective factors among youths;

- associations between individual risk and protective factors and youth substance use;

- relative predictive power of different categories (or "domains") of risk and protective factors in predicting youth substance use;

- examination of the effect of family and neighborhood characteristics on youth substance use based on the hierarchical nature of these data; and

- changes in risk and protective factors over time, and the relation of this change to observed changes over time in the prevalence of youth substance use.

1.1.1 Related Prevention Literature

The role of risk and protective factors has been a major focus in the research on youth substance use for more than 20 years. Perhaps the most influential review of risk and protective factors related to youth substance use was conducted by Hawkins, Catalano, and Miller (1992) of the Social Development Research Group, School of Social Work, University of Washington, Seattle. This review article is widely cited and provides one of the most comprehensive and rigorous assessments of the research to date. Other major reviews of the risk and protective

factor literature were conducted by Petraitis, Flay, Miller, Torpy, and Greiner (1998) and Botvin, Botvin, and Ruchlin (1998). Botvin and colleagues reviewed the effectiveness of selected substance use prevention programs, classifying the programs into four types of approaches: *information dissemination, affective education, social influence, and comprehensive or expanded social influences*. Information dissemination approaches provide information about the risks of substance use, and affective education approaches focus on personal and social development. Both information dissemination and affective education approaches have been shown to have little or no effect in reducing substance use due to their narrow focus. Social influence and integrated social influence approaches have, however, been shown to be effective. Social influence approaches involve persuasive messages from peers and the media, and integrated social influence/competence enhancement approaches teach self-management, social, cognitive, self-esteem enhancing, adaptive coping, and general assertiveness strategies and skills. Each of these latter two approaches has been linked to significant reductions in the use of cigarettes, alcohol, and illicit drugs.

A recent review of science-based substance abuse prevention programs (i.e., those that have been shown through rigorous scientific evaluation to reduce substance use), including a comprehensive review of risk and protective factors related to substance use, was published by CSAP (2001). In this review, as in most reviews of this literature, risk and protective factors were divided into a series of life areas or "domains" in order to reflect how these factors extend across multiple facets of youths' lives. The CSAP review indicated that successful substance abuse prevention programs have typically been programs that can decrease risk factors and increase protective factors across multiple domains.

1.1.2 Relation to Earlier Report on *Risk and Protective Factors for Adolescent Drug Use: Findings from the 1997 NHSDA*

The NHSDA provides estimates of the prevalence, incidence, demographic and geographic distribution, and correlates of use of illicit drugs, alcohol, and tobacco in the civilian, noninstitutionalized U.S. population 12 years of age or older. The survey gives particular emphasis to collecting information on youths by oversampling 12 to 17 year olds and by using questionnaire modules designed exclusively for youths. In 1997, a new module was added for 12 to 17 year olds to examine risk and protective factors related to substance use. In 1998, and again in 1999, the module on risk and protective factors was expanded and improved. The 1999 NHSDA included a comprehensive set of risk and protective factor items based on the extensive review of risk and protective factors for youth substance use by Hawkins et al. (1992).

A report based on the risk and protective factors measured in the 1997 NHSDA was published by the Office of Applied Studies (OAS) in February 2001 (Lane, Gerstein, Huang, &

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Wright, 2001). The present report updates, expands, and improves on the information in the 1997 report in a number of ways.

- First, the 1999 sample (66,706 persons aged 12 or older, with 25,357 youths aged 12 to 17) was much larger than the 1997 sample (24,505 persons aged 12 or older, with 7,844 youths aged 12 to 17); therefore, the precision of the estimates was improved.

- Second, the number of questions was expanded, providing data on a more comprehensive set of risk and protective factors.[4] This expansion of the number of questions also allowed for the construction of multiple-item scales to measure many of the individual factors, as opposed to the single items used in the previous report. (See the tables in Chapter 2 for the distribution of risk and protective factors for the Nation as a whole and by age, race/ethnicity, and gender.)

- Third, the analyses were extended to explore risk and protective factors in a hierarchical model, reflecting the nested nature of youths living in households that in turn comprise neighborhoods. Hierarchical modeling and analysis have been described by Goldstein (1995), Snijders and Bosker (1999), and Raudenbush and Bryk (2002).[5]

- Fourth, a discussion of trends was included assessing how risk and protective factors may have changed over 2 years, both with respect to the distribution of the factors and to the strength of their associations with the use of marijuana. Also discussed is the extent to which the decrease in the prevalence of marijuana among youths may be attributable to changes in the distribution of the factors or their association with marijuana use.

The classification approach used in this report categorizes the set of risk and protective factors into one of four domains based on the categories presented by Hawkins et al. (1992): *community, family, peer/individual, and school*. The 1999 NHSDA questionnaire included specific items drawn from the research literature on prevention related to each of these domains. The factors in each domain are discussed in Chapter 2, and a complete list of the questions and response categories included in the analyses is presented in Tables A.1 to A.4 (see Appendix A). The community domain includes such factors as community disorganization and crime and the availability of illicit drugs. The family domain includes such factors as parental attitudes toward youth substance use and parental communication with youths about the dangers of substance use. The peer/individual domain includes such factors as antisocial behavior and friends' use of licit

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[4] There were 38 questions directly relevant to risk and protective factors for youth substance use in the 1997 NHSDA compared with 60 such questions in the 1999 NHSDA.

[5] Some aspects of hierarchical modeling are addressed in more detail in Chapter 4 of this report.

and illicit drugs. The school domain includes such factors as sanctions against substance use at school and exposure to prevention messages in school. Most of the items addressing these factors were designed for and asked only of the 12 to 17 year olds in the sample. Most items focused on current or past year perceptions or on past year behavior.

1.1.3 Organization of the Report

Chapter 1 provides a general introduction to the NHSDA methodology and the organization of the risk and protective factors included in this report.

Chapter 2 looks at the prevalence of the various risk and protective factors in the population as a whole and by demographic variables, such as race/ethnicity, gender, and age.

Chapter 3 examines the associations between these factors and past year marijuana use.

Chapter 4 explores the relative predictive power of risk and protective factors, both individually and by domain, in a multiple logistic regression analysis. It also attempts to develop the best model to "predict" youth marijuana use, based on a reduced set of risk and protective factors from all four domains. Finally, it explores the extension of modeling to explain variation at higher levels of the hierarchical structure (i.e., families and communities), including a brief general introduction to hierarchical modeling. Models of cigarette use and alcohol use are also presented in selected tables.

Chapter 5 discusses some methods and issues associated with measuring the change in risk and protective factors over time, and it compares the distributions of risk and protective factors from 1997 to 1999 and the associations between these risk and protective factors and marijuana use for these 2 years.[6] It also discusses how changes in the distribution of risk and protective factors and changes in the strength of association between the risk and protective factors and marijuana use between 1997 and 1999 may explain the decrease in youth marijuana prevalence rates during this period.

Chapter 6 discusses the final conclusions from this report.

Consistent with the 1997 report (Lane et al., 2001), the analyses in this report focus on past year marijuana use. Selected analyses are presented for alcohol and cigarette use in Chapter 4. Analyses were not conducted on the use of illicit drugs other than marijuana because few of

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[6] Because of the expansion of the number of questions between 1997 and 1999, as well as improvements made to the wording and response options to some questions, the discussion of change between 1997 and 1999 was limited to factors included in both years of the survey using comparable questions.

the questions focused specifically on youths' attitudes, beliefs, and behaviors specific to those substances. Unless otherwise stated, all statements in the text regarding statistical associations between variables or differences between groups have been tested at the .05 level.

A directory of the prevention domains, constructs, and individual questions used to measure risk and protective factors is presented in Appendix A. A discussion of missing data for questions relating to the school domain is presented in Appendix B. A discussion of how risk and protective factors and substance use differ by age is presented in Appendix C. Further information about methodological changes between the 1997 and 1999 NHSDAs that impacted the comparison of youth prevalence rates for marijuana in those 2 years is presented in Appendix D. Comparisons of the wording, distributions, and associations with marijuana use of the risk and protective factors measured using similar, but not identical, questions in 1997 and 1999 are presented in Appendix E.

1.2   Overview of the NHSDA Methodology

The NHSDA is a primary source of statistical information on the use of illicit drugs by the U.S. population. Conducted by the Federal Government since 1971, the survey collects data by administering questionnaires to a representative sample of the population through face-to-face interviews at their place of residence. The survey is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA), and data collection is carried out by RTI in Research Triangle Park, North Carolina, under a contract with SAMHSA's Office of Applied Studies (OAS). This section briefly describes the 1999 NHSDA methodology. A more complete description is provided in another SAMHSA report (OAS, 2000).

The survey covers residents of households, noninstitutional group quarters (e.g., shelters, rooming houses, dormitories), and civilians living on military bases. Persons excluded from the survey include homeless people who do not use shelters, active military personnel, and residents of institutional group quarters, such as jails and hospitals.

1.2.1   Redesign of the NHSDA

Prior to 1999, the NHSDA was conducted using a paper-and-pencil interviewing (PAPI) methodology, and the interviews generally lasted about an hour. The 1999 NHSDA marked the first survey year in which the national sample was interviewed via computer-assisted interviewing (CAI; specifically, a combination of computer-assisted personal interviewing [CAPI] and audio computer-assisted self-interviewing [ACASI] techniques). For the most part, questions previously administered by the interviewer are now administered by the interviewer using CAPI. Questions previously administered using answer sheets are now administered using

ACASI. Use of ACASI is designed to provide the respondent with a highly private and confidential means of responding so as to maximize honest reporting of illicit drug use and other sensitive behaviors. In 1999, the sample size was increased from approximately 25,500 persons in 1998 (6,778 youths aged 12 to 17) to 66,706 persons in 1999 (25,357 youths aged 12 to 17).

The 1999 NHSDA employed a 50-State design with an independent, multistage area probability sample for each of the 50 States and the District of Columbia. The eight States with the largest population (which together account for 48 percent of the total U.S. population aged 12 or older) were designated as large sample States (California, Florida, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas). For these States, the design provided a sample large enough to support direct State estimates. For the remaining 42 States and the District of Columbia, smaller, but adequate, samples were selected to support State estimates using small area estimation (SAE) techniques. The design also oversampled youths and young adults, so that each State's sample was approximately equally distributed among three major age groups: 12 to 17 years, 18 to 25 years, and 26 years or older.

Due to differential sampling rates among the 50 States and the District of Columbia and across the age groups of interest, sampling weights are needed to produce the correct population estimates. In addition to reflecting the probability of selection, the sample weights also incorporate other adjustments for nonresponse, control of extreme weights, and poststratification to known population totals. For some key variables that still had missing values after the editing process, values were statistically imputed. The sampling weights have been used in all analyses in this report except for the hierarchical modeling. For more information on statistical procedures used in the NHSDA, see the reports on the results from the 1999, 2000, and 2001 NHSDAs (OAS, 2000, 2001, 2002a, 2002b).

1.2.2 1999 CAI and 1999 PAPI

To assess the impact of the change in data collection mode from PAPI to CAI and to measure trends in substance use, the 1999 survey utilized a dual-sample design. The main sample of 66,706 respondents was interviewed using the CAI methodology, while an additional 13,809 supplemental interviews were conducted via the PAPI methodology. The intent was to use the 1999 PAPI data to measure changes in use patterns because the methodology was the same as was used in prior years. The supplement was selected from a national subsample of 250 geographic strata. Both the main (CAI) and supplemental (PAPI) surveys were conducted from January through December 1999. With the exception of comparisons between the 1997 and 1999 surveys that are presented in Chapter 5, all analyses presented in this report utilized the 1999 computer-based interview. More information about the 1999 PAPI is presented in Chapter 5.

Chapter 2. Distributions of Risk and Protective Factors for Substance Use

2.1   Introduction

This chapter presents summary statistics for each of the risk and protective factors that were included in the 1999 National Household Survey on Drug Abuse (NHSDA). This chapter addresses the following issues:

- descriptions of how the risk and protective factors were measured in the 1999 NHSDA;

- prevalence of the risk and protective factors among youths aged 12 to 17, including the average scale score for multiple item risk and protective factors at the national level; and

- differences in the prevalence of the risk and protective factors for different demographic groups, including the average scale score for multiple item risk and protective factors by age, race/ethnicity, and gender.

The 1999 NHSDA included 24 risk and protective factors divided into 4 domains: *community, family, peer/individual, and school*. Some of these factors were measured using multiple-item scales; others were measured using single items.[7] When more than one item was used to measure a factor, the responses from all the items were combined into a single score. These scores were computed by taking the mean of all the items used to measure a given construct. All scales were coded such that higher scale scores for risk factors indicated that a respondent was at higher risk for substance use. Higher scores for protective factors indicated that a respondent scored high on variables that had a lower risk for substance use.

Appendix A contains a complete list of the questions used to create the measures for each of the risk and protective factors (Tables A.1 to A.4); the distributions for each of these questions (Tables A.5 to A.8); and the correlations between the risk factors (Table A.9), the correlations between the protective factors (Table A.10), and the correlations between the risk factors and the protective factors (Table A.11). These correlations show the degree to which each factor is associated with the other factors. When two factors are highly correlated (i.e., greater than 0.50 or less than -0.50), the questions making up these factors may be measuring similar constructs. Tables 2.1 to 2.4 present the following summary statistics for each factor: (1) the

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[7] Single-item factors were measured using a single question in the NHSDA questionnaire. Each of these single items contained two or more response options. Multiple-item scales are factors that were measured using two or more questions in the NHSDA questionnaire, with each question having the same scale of response items.

number of items used to measure the factor; (2) the sample size (number of youths with scores for each factor); (3) the range of responses for continuous factors; (4) the mean scale score for continuous factors or percentage giving a certain response for dichotomous factors; (5) the standard deviation for continuous factors; (6) the quartiles for continuous factors; and (7) Cronbach's alpha reliability[8] for factors with two or more items.

Most items specific to substance use were asked separately for marijuana, cigarettes, and alcohol. In Chapters 2 and 3 of this report, each of these factors is first presented as a "multiple substance" scale, which is a scale score derived by taking the mean of the responses for these three substances. Following this, scores for the separate substances are presented.

In this chapter, descriptive statistics for each of the risk and protective factors are first presented for the full national sample. For clarity of presentation, the distributions for some factors are presented in figures. Descriptive statistics then are presented separately for different racial/ethnic groups (whites, blacks, Hispanics, and "others"), genders, and age groups. Researchers may find the nationally representative scale scores by age, race/ethnicity, and gender helpful in providing a comparison to similar scores based on local analyses.

For about half of the factors, the distribution of responses was skewed, meaning that most youths gave the same or similar responses to the questions. Among the risk factors, most youths agreed that community adults and parents would strongly disapprove of their use of marijuana, that they themselves would disapprove of other youths using marijuana, and that the prevalence of marijuana use was low among community adults, their friends, and students in their grade at school. Among protective factors, most youths agreed that their parents provide encouragement and that their schools had strong sanctions against illegal drug and alcohol use.

2.2   Community Domain

Community domain risk and protective factors included community disorganization and crime, neighborhood cohesiveness, community attitudes toward substance use, community norms toward substance use, availability of illicit drugs, and exposure to prevention messages. The individual questions that were used to create these factors are presented in Table A.1, and the distributions of these individual items are presented in Table A.5 (see Appendix A). Summary statistics for each of these factors are presented in Table 2.1.

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[8] Cronbach's coefficient alpha is a measure of internal consistency of multiple-item scales. The alphas for these scales ranged from 0.59 to 0.89, with most scales having alphas over 0.70. These alphas indicate that these scales have reasonable internal consistency.

2.2.1 Community Disorganization and Crime

Community disorganization and crime constitute a risk factor that focuses on the physical environment and level of crime in neighborhoods. This factor was measured using six questions in which youths were asked how much they agreed or disagreed that there was a lot of crime, a lot of drug selling, a lot of street fights, many empty or abandoned buildings, a lot of graffiti, and many people moving in and out of their neighborhoods. Each question was answered using the following scale: 1 ("strongly disagree"), 2 ("somewhat disagree"), 3 ("somewhat agree"), and 4 ("strongly agree"). The mean score on these six questions was 1.65, which is between strongly disagree and somewhat disagree. Among the individual items, youths were more likely to somewhat or strongly agree that people often moved in and out of their neighborhoods (30.5 percent) and that there was a lot of drug selling in the neighborhood (25.7 percent) compared with other items (Figure 2.1). Fewer youths agreed that there were a lot of street fights (14.1 percent) or many empty/abandoned buildings in their neighborhoods (11.1 percent).

2.2.2 Neighborhood Cohesiveness

Neighborhood cohesiveness is a protective factor that was measured by asking youths how much they agreed or disagreed that people in the youths' neighborhood helped each other out and visited each other in their homes. The questions were answered using the same 1 ("strongly disagree") to 4 ("strongly agree") scale used for community disorganization and crime. The mean and median scores on these questions were around 3.00, indicating that on average youths "somewhat agreed" to these statements (Table 2.1). Among the individual items, approximately 78.5 percent of youths somewhat or strongly agreed that people in their neighborhood often help each other out, and 72.9 percent of youths somewhat or strongly agreed that people in their neighborhood often visit each other's homes (Table A.5).

2.2.3 Community Attitudes Toward Substance Use

Community attitudes toward substance use (specifically, lack of adult disapproval of youth substance use) constitute a risk factor that focuses on youths' perceptions of how adults in their neighborhood would feel about the youth using marijuana, cigarettes, or alcohol. Youths were asked whether they thought that most neighborhood adults would "strongly disapprove," "somewhat disapprove," or "neither approve nor disapprove" (scored 1, 2, and 3 respectively) if the respondent were to try marijuana or hashish once or twice, smoke one or two packs of cigarettes per day, or have one or more drinks of an alcoholic beverage nearly every day. The mean score across these three substances was 1.42, which falls between strongly disapprove and somewhat disapprove (Table 2.1). Among the different substances, 78.8 percent of youths reported that most neighborhood adults would strongly disapprove if they tried marijuana, 65.1

Figure 2.1 Percentages of Youths Aged 12 to 17 Reporting That They Somewhat or Strongly Agreed with Community Disorganization and Crime Items: 1999
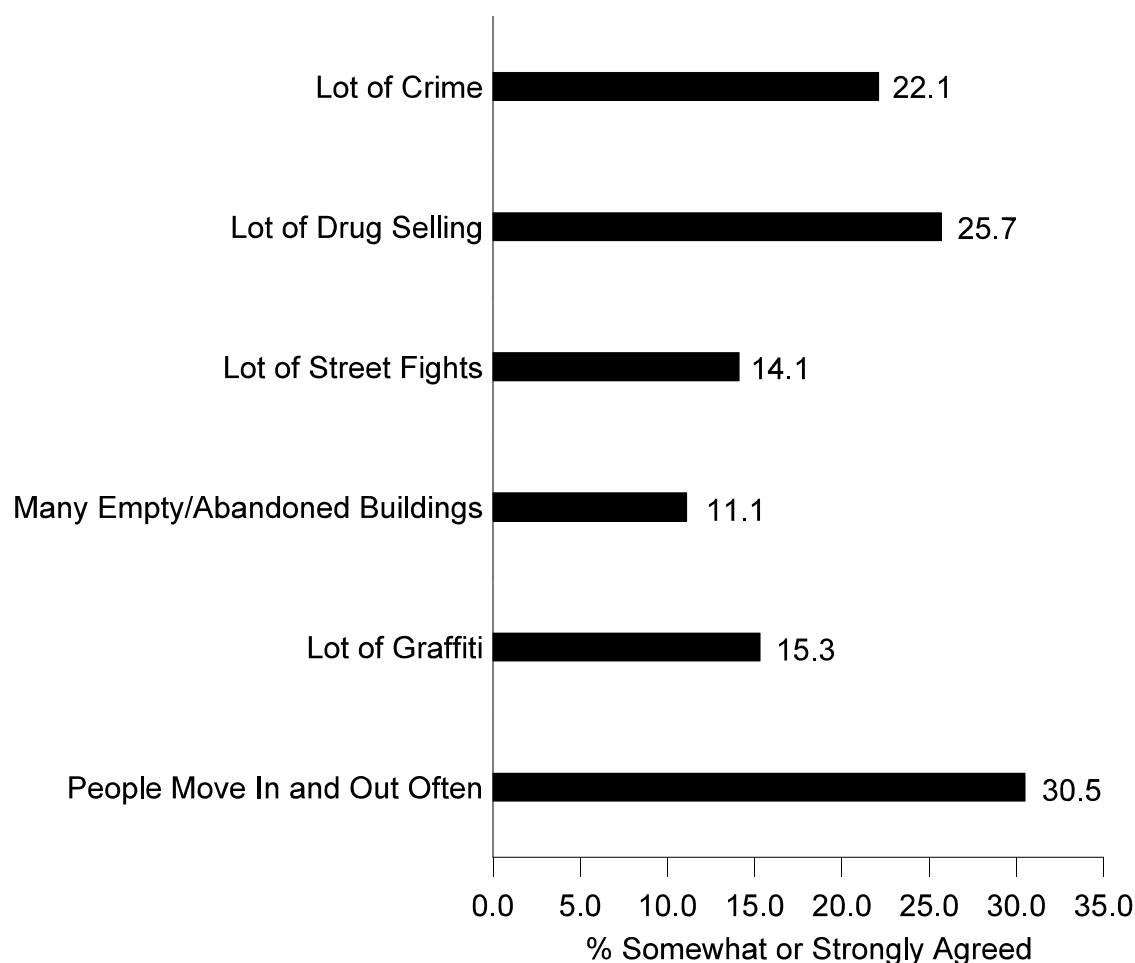
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

percent reported that most neighborhood adults would strongly disapprove if they smoked cigarettes daily, and 70.3 percent reported that most neighborhood adults would strongly disapprove if they drank alcohol daily (Table A.5).

2.2.4   Community Norms Toward Substance Use

Community norms toward substance use (specifically, knowing adults who are substance users) constitute a risk factor that focuses on youths' perceptions of substance use among adults they know personally. Youths were asked whether "none," "some," "most," or "all" (scored 1, 2, 3, and 4 respectively) of adults they know personally used marijuana/hashish, smoked cigarettes, drank alcoholic beverages, or got drunk at least once a week. The mean score across the four questions was 1.88, which falls between "none" and "some" on the scale (Table 2.1). Among the individual substances, youths were more likely to report that most or all of the adults they

personally knew used alcohol (45.2 percent) or cigarettes (28.3 percent) compared with marijuana (3.8 percent) (Figure 2.2). However, more than one out of four youths (28.8 percent) reported that they knew at least some adults who used marijuana, and nearly half of youths (45.1 percent) reported that they personally knew at least some adults who got drunk once a week or more (Table A.5).

Figure 2.2   Percentages of Youths Aged 12 to 17 Reporting Substance Use by Adults Whom They Knew Personally: 1999

Number of Known Adults Who Use Substances

■ None of Them   □ Some of Them   ▨ Most / All of Them
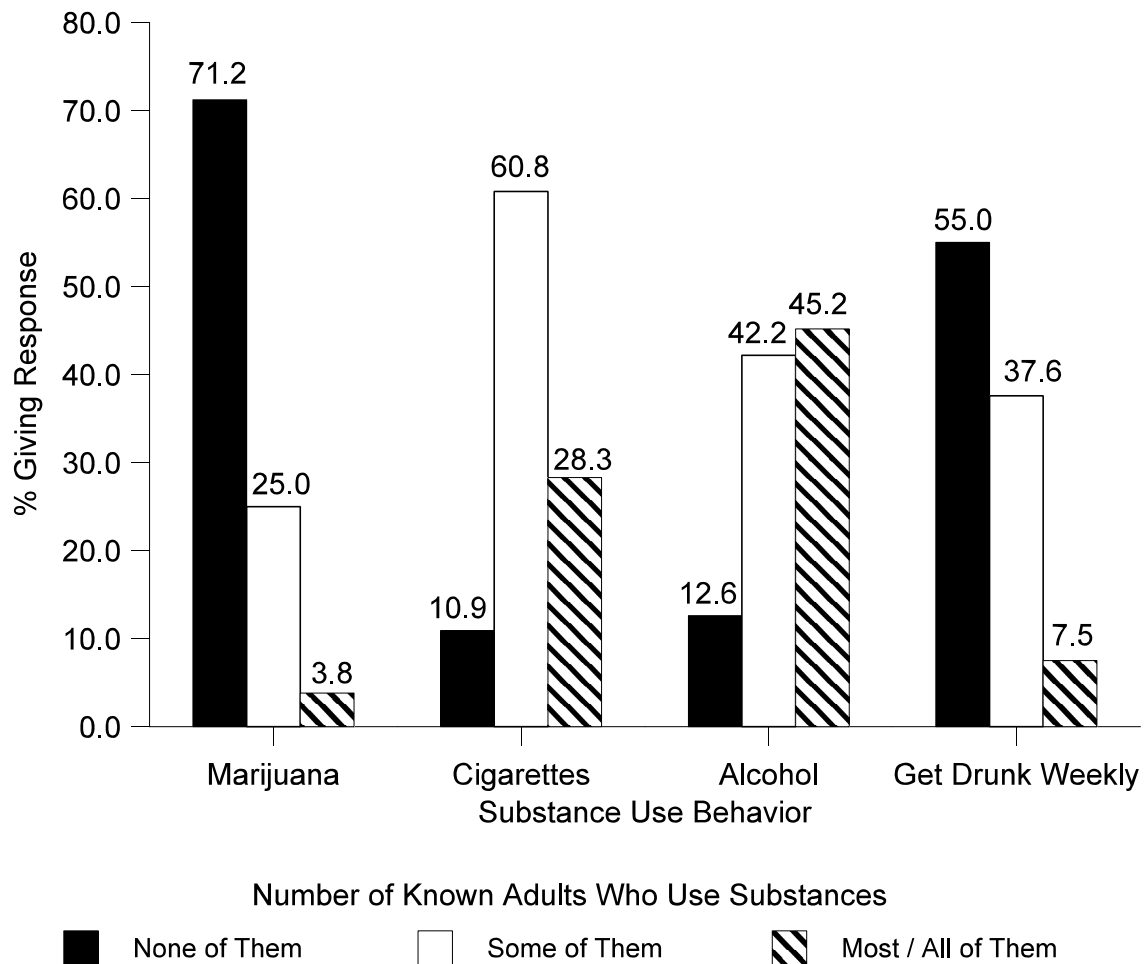
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

2.2.5   Availability of Illicit Drugs

Availability of illicit drugs, a risk factor, was measured by asking youths how difficult or easy it would be for them to get marijuana, LSD, cocaine, crack, or heroin if they wanted some. The questions were answered using the following scale: 1 ("probably impossible"), 2 ("very difficult"), 3 ("somewhat difficult"), 4 ("somewhat easy"), or 5 ("very easy"). The mean response

was 3.41, which falls between somewhat difficult and somewhat easy (Table 2.1). Among the different substances, youths were more likely to report that marijuana was fairly or very easy to obtain (56.5 percent) compared with other drugs (Figure 2.3). Approximately one out of four youths reported that it would be fairly or very easy for them to obtain LSD (24.9 percent), cocaine (27.5 percent), or crack (28.4 percent). Nearly one in five youths (18.1 percent) reported that heroin would be fairly or very easy to obtain.

Figure 2.3   Percentages of Youths Aged 12 to 17 Reporting That Drugs Would Be Fairly or Very Easy to Obtain: 1999
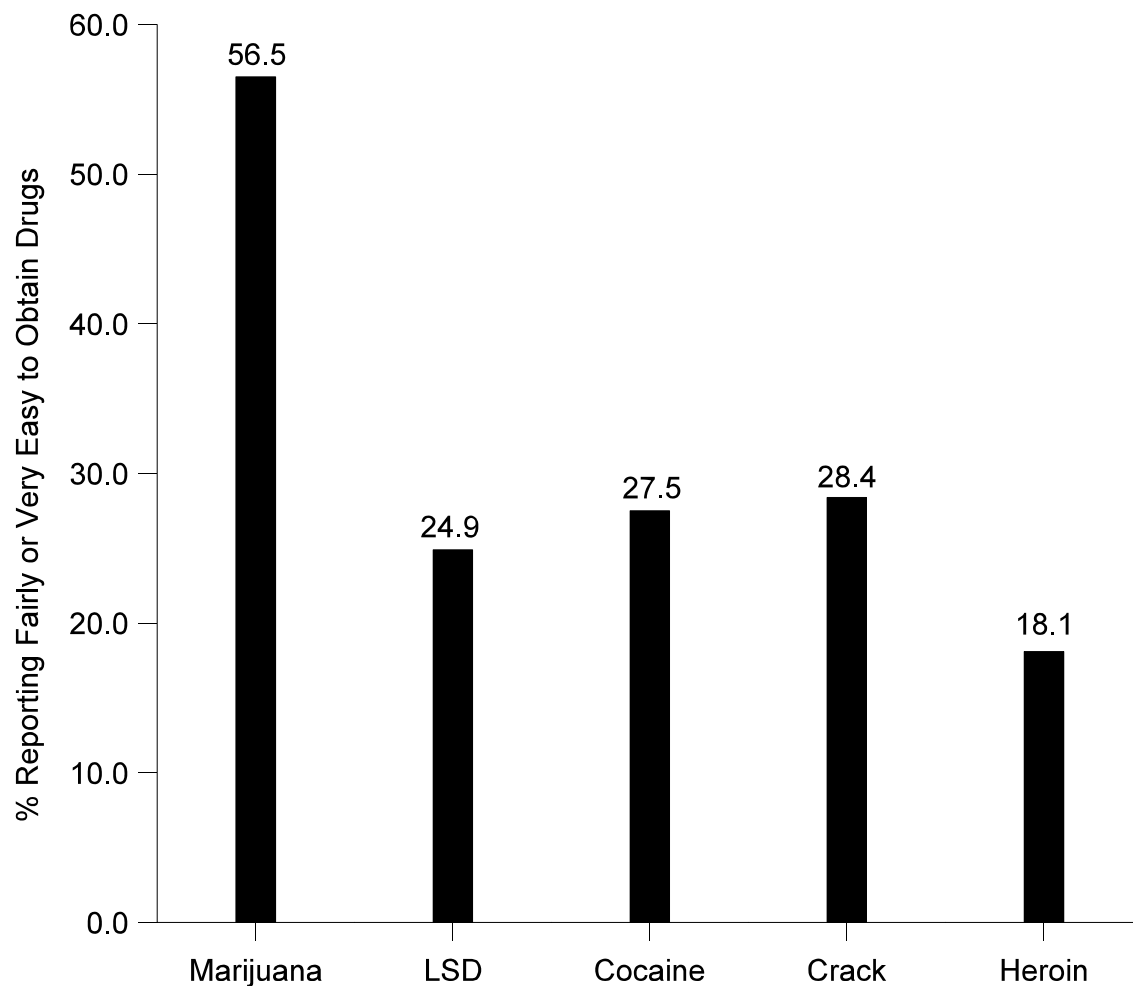
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

2.2.6   Exposure to Prevention Messages in the Media

Exposure to prevention messages in the media, a protective factor, was measured by a single item asking youths whether they had seen or heard any alcohol or drug prevention messages from sources outside of school, such as posters, pamphlets, and radio or TV ads, in the

past 12 months. Among youths, 82.3 percent reported that they had seen or heard these types of prevention messages in the past 12 months (Table A.5).

2.2.7   Community Factors, by Race/Ethnicity, Gender, and Age

Summary statistics for the community factors are presented by racial/ethnic groups, gender, and age in Table 2.5.[9] Among youths, whites reported less community disorganization and crime, and more neighborhood cohesiveness, compared with other racial/ethnic groups. The perceived availability of marijuana was approximately equal among whites, blacks, and Hispanics, but marijuana was perceived to be less available for youths in the "other" category. Exposure to prevention messages in the media was reported more often by whites (83.5 percent) and youths in the "other" category (86.2 percent) compared with blacks (78.3 percent) and Hispanics (78.7 percent). There were no notable differences between racial/ethnic groups in community attitudes or community norms toward substance use.

There were little or no differences between males and females on the community disorganization and crime, neighborhood cohesiveness, community attitudes toward substance use, community norms toward substance use, or availability of marijuana measures. Females were more likely than males to have reported exposure to prevention messages in the media (84.6 vs. 80.0 percent).

Differences between younger and older youths are expected, largely due to common adolescent growth factors. For example, youths aged 15 to 17 reported that marijuana would be easier for them to obtain than did youths aged 12 to 14. There were no notable differences between these age groups for community disorganization and crime, neighborhood cohesiveness, community attitudes and norms toward substance use, or exposure to prevention messages in the media. For more information about distributions of risk and protective factors in the community domain by gender and age, see Appendix C.

2.3   Family Domain

Family domain variables included parental monitoring, parental encouragement, parental attitudes toward substance use, parental communication about substance use, and parents as a source of social support. The individual questions used to create these factors are presented in

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[9] Care should be taken in interpreting statistically significant differences between these demographic groups. When sample sizes are large, very small differences between groups can reach statistical significance. For this reason, group differences are only discussed if the scale scores or distributions show sizable differences between groups.

Table A.2, and the distributions of these items are presented in Table A.6 (see Appendix A). Summary statistics for each of these factors are presented in Table 2.2.

2.3.1 Parental Monitoring

Parental monitoring (specifically, a lack of parental monitoring) is a risk factor that focuses on youths' perceptions of rules placed upon them by their parents and how closely parents monitor youths' activities. This was measured using a set of five questions in which youths were asked how often in the past 12 months their parents checked on whether the youths had done their homework, provided help with homework if needed, made youths do chores around the house, limited the amount of television that youths watch, and limited the amount of time that youths spend with friends on school nights. Available response options for these questions were 1 ("always"), 2 ("sometimes"), 3 ("seldom"), or 4 ("never"). The mean and median on the scale was 2.00, indicating that, on average, youths perceived that their parents sometimes engage in these activities (Table 2.1). As shown in Figure 2.4, among the individual

Figure 2.4 Percentages of Youths Aged 12 to 17 Reporting Different Responses to Parental Monitoring Items: 1999
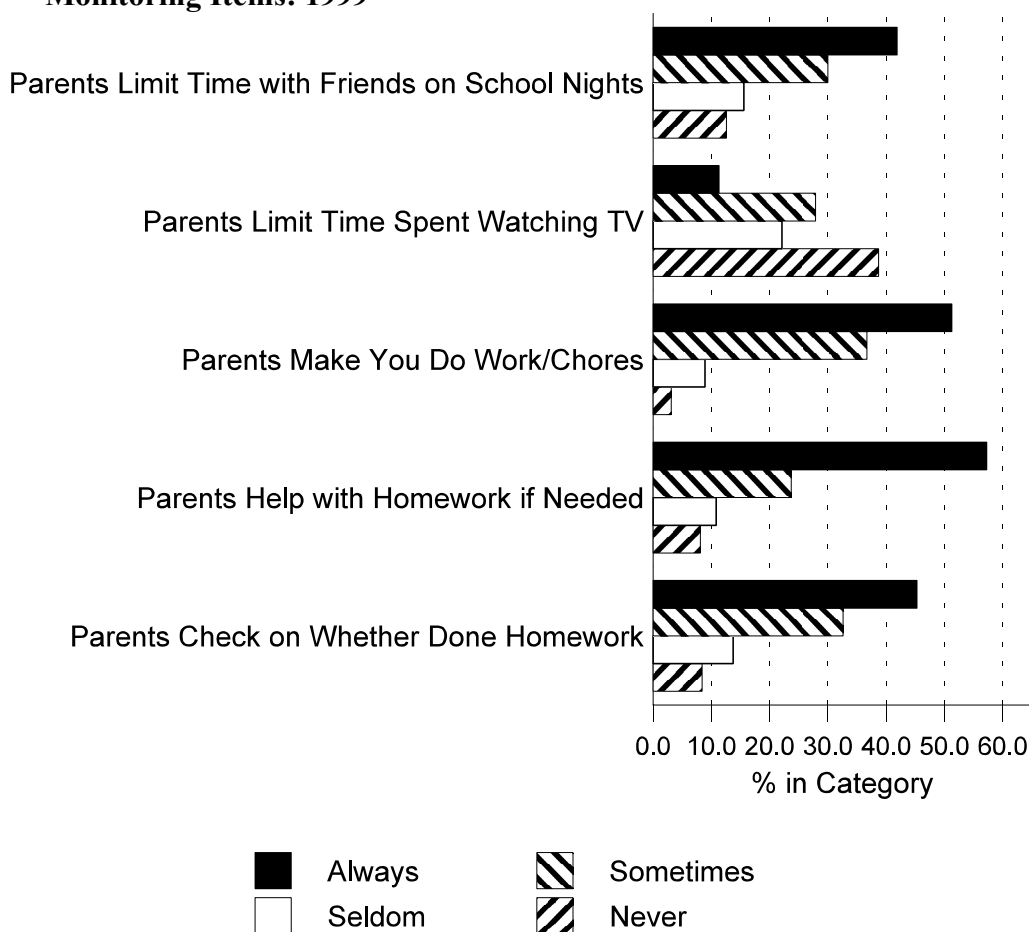
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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items, youths were more likely to report that parents sometimes or always made them do work/chores around the house (88.0 percent) and provided help with homework if needed (81.0 percent) compared with other items. Only 39.2 percent of youths reported that their parents limited the amount of time they watch television.

2.3.2 Parental Encouragement

Parental encouragement is a protective factor measured using two items in which youths were asked how often in the past 12 months their parents let them know they had done a good job and let them know they were proud of them for something they had done. The response options were 1 ("never"), 2 ("seldom"), 3 ("sometimes"), or 4 ("always"). The mean score across these two items was 3.34, and the median was 3.50, which falls between "sometimes" and "always" on the scale (Table 2.2). As shown in Figure 2.5, most youths reported that their

Figure 2.5 Percentages of Youths Aged 12 to 17 Reporting Different Responses to Parental Encouragement Items: 1999
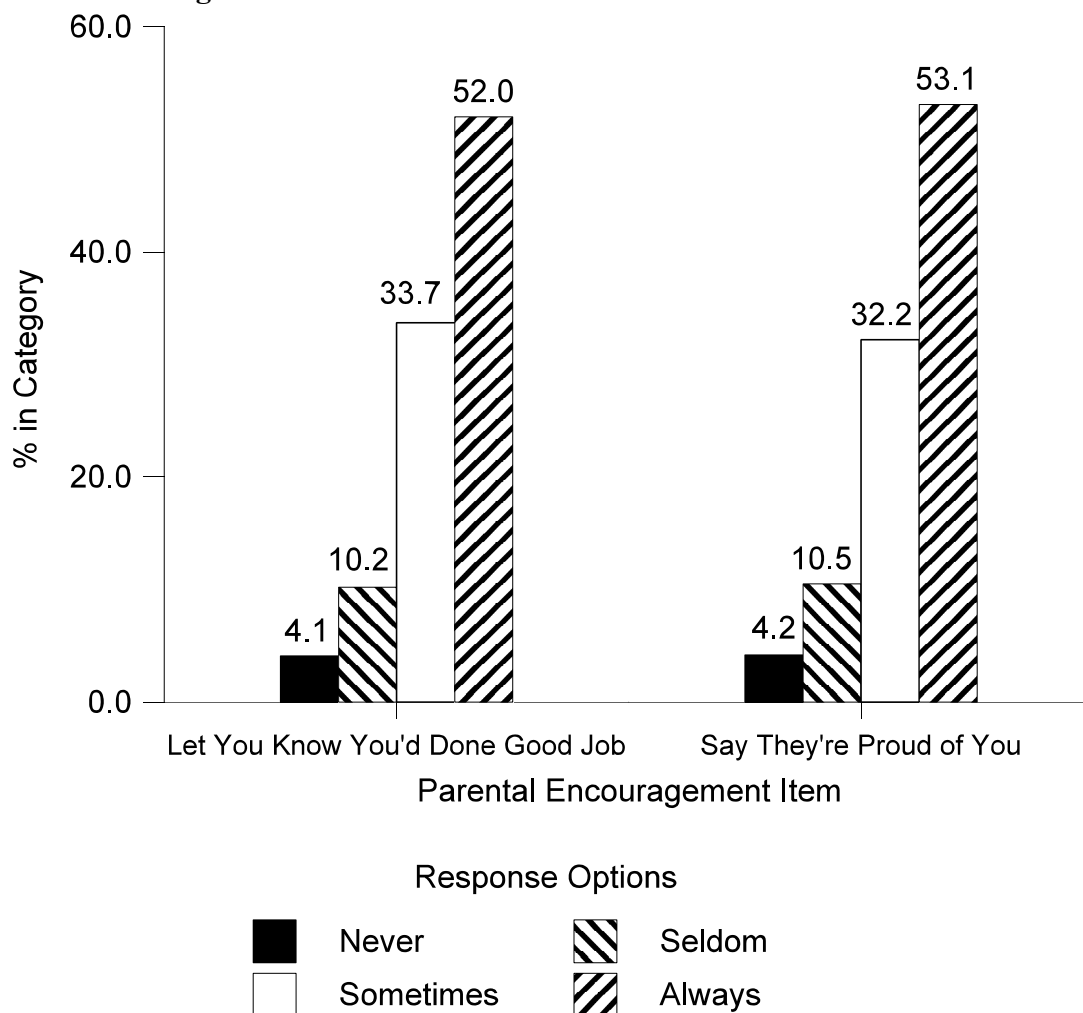
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

parents sometimes or always let them know they had done a good job (85.7 percent) and told youths they were proud of them for something they had done (85.3 percent).

2.3.3 Parental Attitudes Toward Substance Use

Another risk factor focused on youths' perceptions of how their parents would feel if the youths used marijuana, cigarettes, or alcohol. Youths were asked three questions about whether they thought their parents would "strongly disapprove," "somewhat disapprove," or "neither approve nor disapprove" (scored 1, 2, and 3 respectively) if the youth were to try marijuana or hashish once or twice, smoke one or two packs of cigarettes per day, or have one or more drinks of an alcoholic beverage almost every day. The mean score across the three substances was 1.16, and the median and quartiles for each individual substance was 1.00, indicating that most youths believed their parents would strongly disapprove if they used these substances (Table 2.2). As shown in Figure 2.6, approximately 9 out of 10 youths reported that their parents would strongly

Figure 2.6   Percentages of Youths Aged 12 to 17 Reporting That Their Parents Strongly Disapproved of Substance Use: 1999
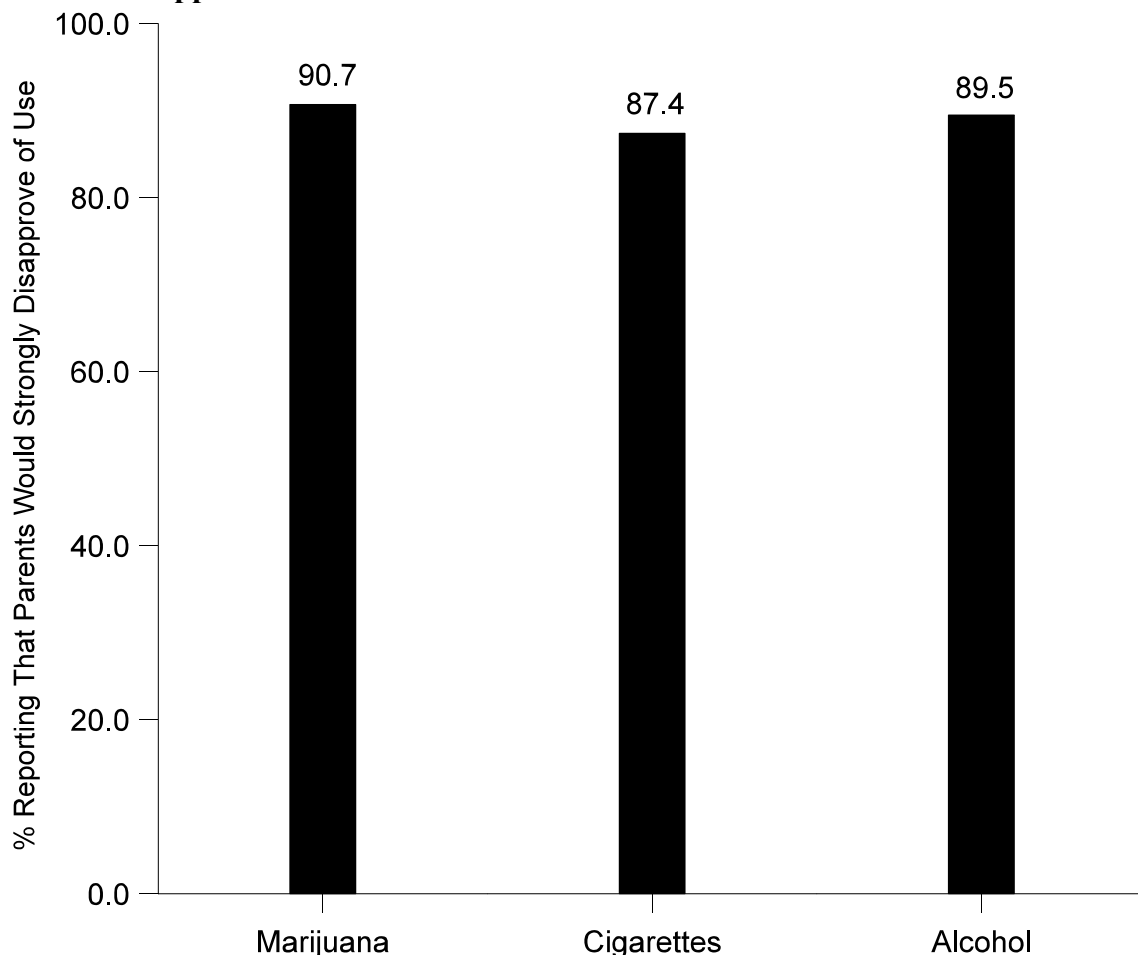
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

disapprove if they tried marijuana once or twice (90.7 percent), had one or more drinks of alcohol every day (89.5 percent), or smoked one or two packs of cigarettes a day (87.4 percent).

2.3.4   Parental Communication about Substance Use

Parental communication about substance use, a protective factor, was measured using a single item in which youths were asked whether they had talked with at least one of their parents about the dangers of tobacco, alcohol, or drug use in the past 12 months. Among youths, 57.4 percent reported that they had spoken with at least one of their parents about the dangers of using these substances in the past 12 months (Table 2.2).

2.3.5   Parents as Source of Social Support

Parents as source of social support, a protective factor, focuses on whether youths would talk to their parents if they needed to discuss a serious problem. A single item asked youths to whom they would turn if they had to discuss a serious problem (see Table A.2 for list of response options). Among youths, 71.7 percent reported that they would turn to either their mother or father if they needed to discuss a serious problem (Table 2.2).

2.3.6   Family Factors, by Race/Ethnicity, Gender, and Age

Summary statistics for family factors are presented by racial/ethnic group, gender, and age in Table 2.6. Among youths, parental communication about the dangers of substance use was reported by more whites (59.9 percent) and Hispanics (57.9 percent) compared with blacks (47.3 percent) or youths in the "other" category (51.1 percent). Youths in the "other" category were less likely to identify their parents as a source of social support (64.3 percent) compared with youths in other racial/ethnic groups. Scores were approximately equal for parental monitoring, parental encouragement, and parental attitudes toward substance use between different racial/ethnic groups.

Among youths, more females than males reported that their parents had communicated with them about the dangers of drug use (60.0 vs. 55.0 percent). There were no notable differences between male and female youths regarding parental monitoring, parental encouragement, parental attitudes toward substance use, or parents as a source of social support.

Youths aged 15 to 17 were less likely to identify their parents as a source of social support (67.0 percent) compared with youths aged 12 to 14 (76.3 percent). Smaller differences were also found for other factors, indicating that youths aged 15 to 17 reported less parental monitoring, less parental encouragement, and less communication from parents about the dangers of drug use compared with youths aged 12 to 14. Perceptions of parental attitudes

toward substance use were approximately equal between youths aged 15 to 17 and youths aged 12 to 14.[10]

2.4   Peer/Individual Domain

Peer/individual domain factors included in the 1999 NHSDA included antisocial behavior, individual attitudes toward substance use, friends' attitudes toward substance use, friends' substance use, perceived risk of marijuana use, risk-taking proclivity, participation in extracurricular activities, and religiosity. The individual questions used to create these factors are presented in Table A.3, and the distributions of these items are presented in Table A.7 (see Appendix A). Summary statistics for each of these factors are presented in Table 2.3.

2.4.1   Antisocial Behavior

Antisocial behavior is a risk factor that focuses on criminal and violent activity by youths. This factor was measured using six items in which youths were asked how many times in the past 12 months they had gotten into a serious fight at school or at work, taken part in a fight where a group of their friends fought against another group, carried a handgun, sold illegal drugs, stolen or tried to steal anything worth more than $50, or attacked someone with the intent to seriously hurt them. The response options for these questions were 1 ("0 times"), 2 ("1 or 2 times"), 3 ("3 to 5 times"), 4 ("6 to 9 times"), or 5 ("10 or more times"). The mean score across the six items was 1.15, and the median was 1.00 (Table 2.3). As seen in Figure 2.7, 21.9 percent of youths reported getting into a serious fight at school or work at least once in the past year, 17.1 percent had taken part in a group-on-group fight at least once in the past year, and 8.4 percent had attacked someone with the intent of seriously injuring them at least once in the past year. Fewer than 5 percent of youths had carried a handgun, sold illegal drugs, or stolen/tried to steal anything worth more than $50 in the past year.

2.4.2   Individual Attitudes Toward Substance Use

Individual positive attitudes toward substance use constitute a risk factor that focuses on how youths feel about someone their age using marijuana, cigarettes, or alcohol. Youths were asked whether they would "strongly disapprove," "somewhat disapprove," or "neither approve nor disapprove" (scored 1, 2, and 3, respectively) if someone their age tried marijuana or hashish once or twice, smoked one or two packs of cigarettes per day, or had one or two drinks of an alcoholic beverage nearly every day (Table A.3). The mean score across the three substances was 1.55, which is between strongly disapprove and somewhat disapprove on the scale (Table

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[10] For more information about distributions of risk and protective factors in the family domain by gender and age, see Appendix C.

Figure 2.7 Percentages of Youths Aged 12 to 17 Who Engaged in Various Antisocial Behaviors One or More Times in the Past Year: 1999

Behavior	% Engaged in Behavior
Attacked Someone with Intent to Seriously Hurt	8.4
Stole/Tried to Steal Anything Worth More Than $50	4.7
Sold Illegal Drugs	3.8
Carried a Handgun	3.6
Taken Part in Group-on-Group Fight	17.1
Got into a Serious Fight at School or Work	21.9

% Engaged in Behavior
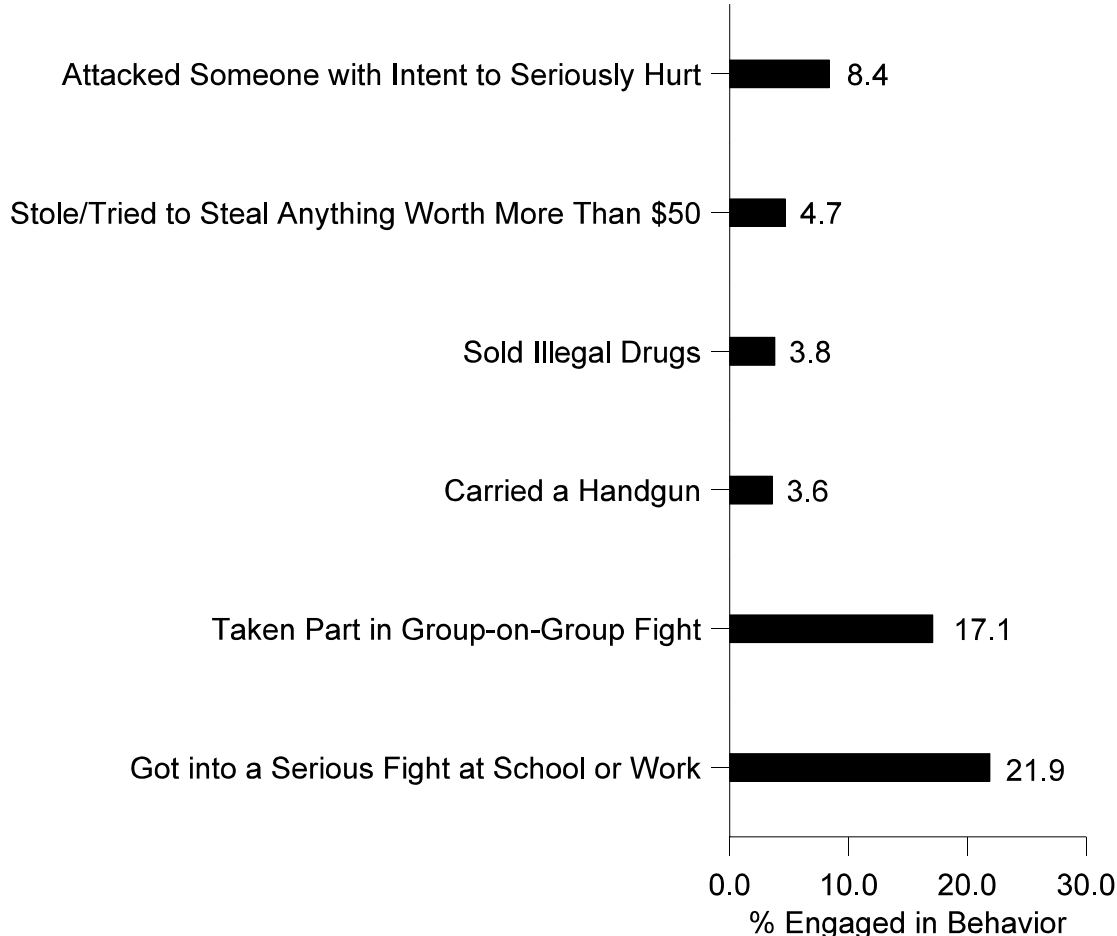
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

2.3). Nearly two out of three youths reported that they would strongly disapprove of youth use of marijuana (63.5 percent), alcohol (63.4 percent), or cigarettes (63.7 percent) (Figure 2.8).

2.4.3   Friends' Attitudes Toward Substance Use

Friends' attitudes toward substance use constitute a risk factor that focuses on youths' perceptions of how their close friends would feel if the respondent were to use marijuana, cigarettes, or alcohol. Youths were asked if they thought their close friends would "strongly disapprove," "somewhat disapprove," or " neither approve nor disapprove" (scored 1, 2, and 3, respectively) if the respondent tried marijuana or hashish once or twice, smoked one or two packs of cigarettes per day, or had one or two drinks of an alcoholic beverage nearly every day (Table A.3). The mean score across the three substances was 1.61, which is between strongly disapprove and somewhat disapprove on the scale (Table 2.3). More youths reported that their

Figure 2.8 Percentages of Youths Aged 12 to 17 Who Would Strongly Disapprove of Substance Use by Same-Aged Peers, by Substance: 1999
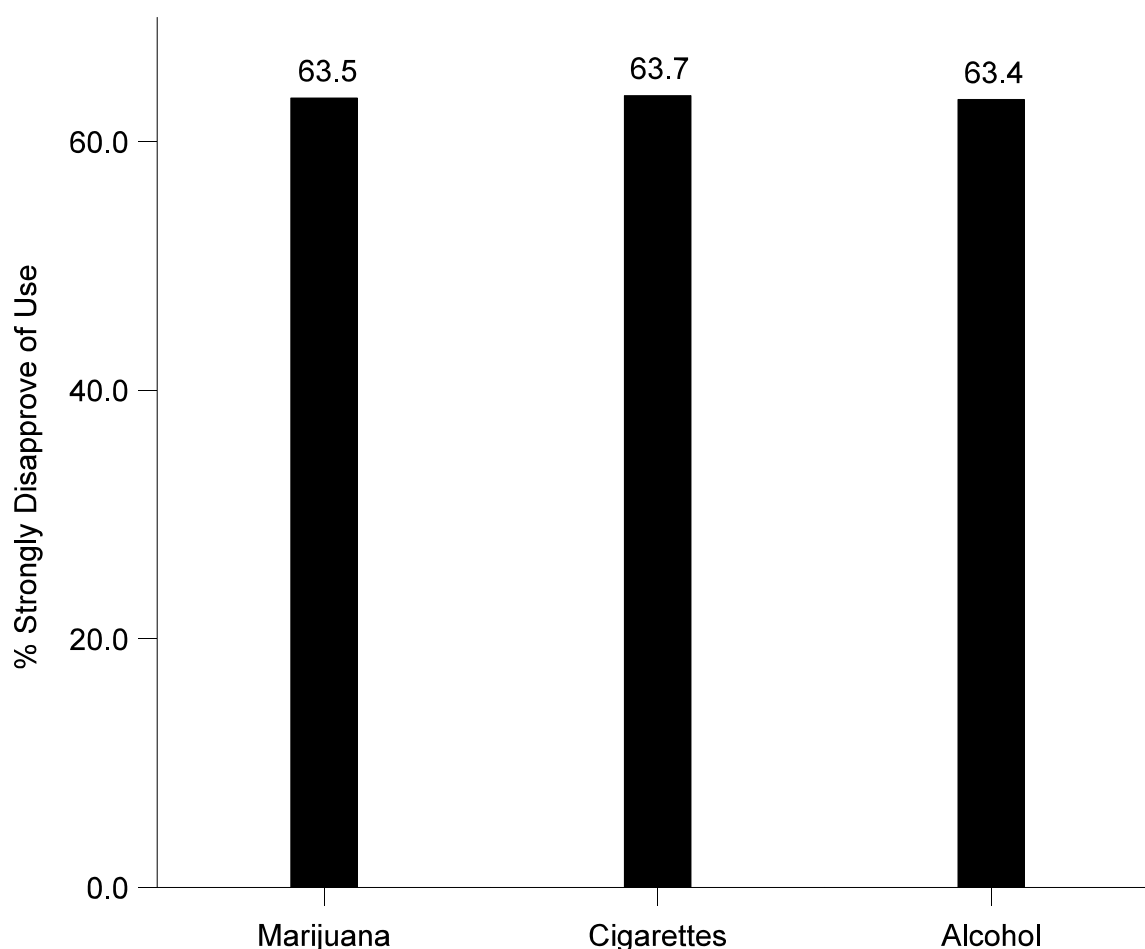
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

friends would strongly disapprove of their trying marijuana once or twice (63.2 percent) compared with daily alcohol use (59.6 percent) or daily cigarette use (57.5 percent) (Figure 2.9).

2.4.4 Friends' Substance Use

Friends' substance use, a risk factor, was measured by asking youths how many of their friends used marijuana or hashish, smoked cigarettes, drank alcohol, or got drunk at least once a week. The response options were 1 ("none of them"), 2 ("a few of them"), 3 ("most of them"), or 4 ("all of them") (Table A.3). The mean score across the four questions was 1.69, which falls between none of them and some of them on the scale (Table 2.3). Among youths, 42.0 percent reported that at least a few of their friends used marijuana, with 11.7 percent reporting that most or all of their friends were marijuana users (Figure 2.10). Nearly 1 out of 4 youths reported that most or all of their friends used alcohol (23.0 percent), nearly 1 out of 5 reported that most or all

**Figure 2.9 Percentages of Youths Aged 12 to 17 Whose Friends Would Strongly
Disapprove of Youth Substance Use, by Substance: 1999**
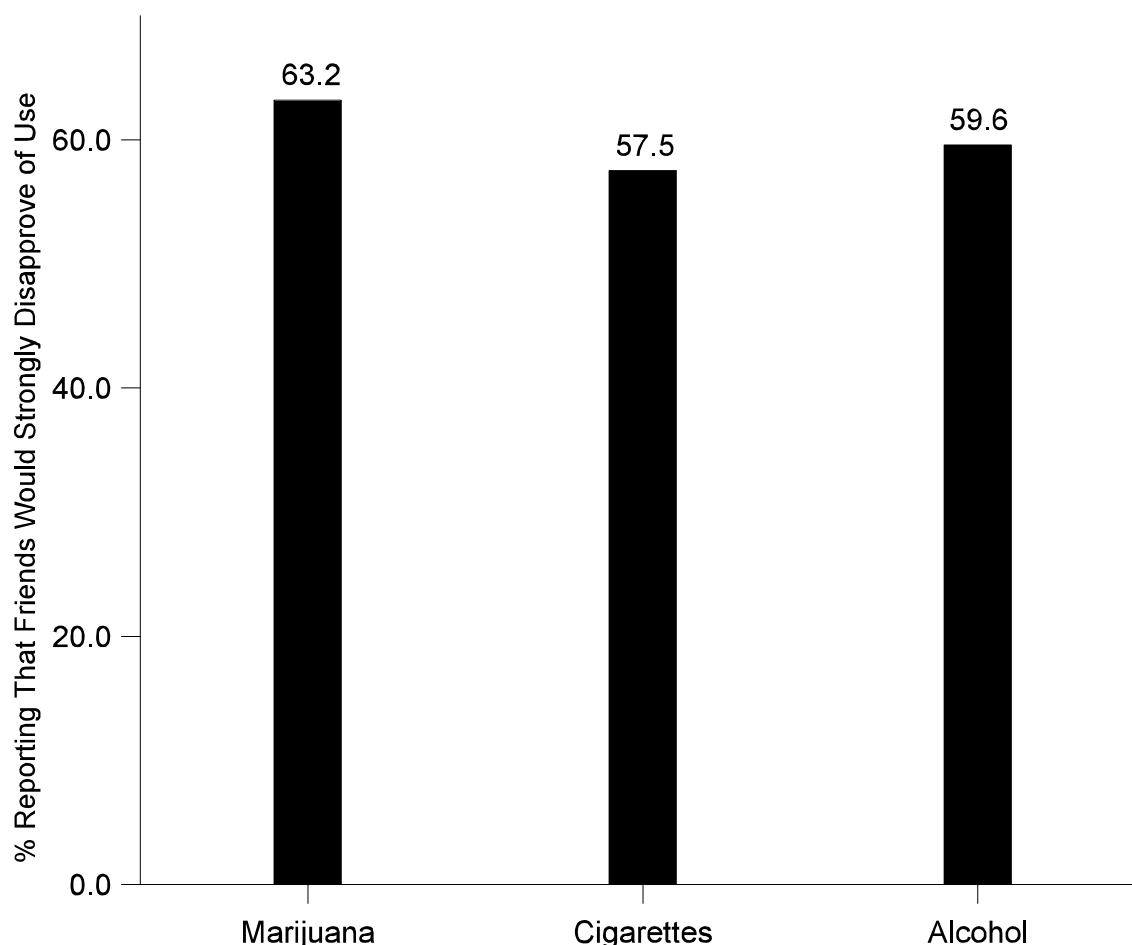
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

of their friends used cigarettes (18.7 percent), and nearly 1 out of 10 reported that most or all of their friends get drunk at least once a week (8.8 percent).

2.4.5   Perceived Risk of Substance Use

Perceived risk of substance use (specifically, low perceived risk), a risk factor, was measured by asking youths how much people risk harming themselves physically and in other ways when they smoke marijuana once a month, smoke marijuana once or twice a week, smoke one or more packs of cigarettes per day, have four or five drinks every day, or have five or more drinks once or twice a week (Table A.3). The response options were 1 ("great risk"), 1 ("moderate risk"), 2 ("slight risk"), or 3 ("no risk"). The mean score was 1.70, indicating that on average youths believed there was between a moderate risk and great risk from using these substances (Table 2.3). More youths reported great risks from drinking four or five drinks nearly every day (63.6 percent), smoking one or more packs of cigarettes a day (60.7 percent), and

Figure 2.10 Percentages of Youths Aged 12 to 17 Reporting Substance Use by Friends, by Substance: 1999
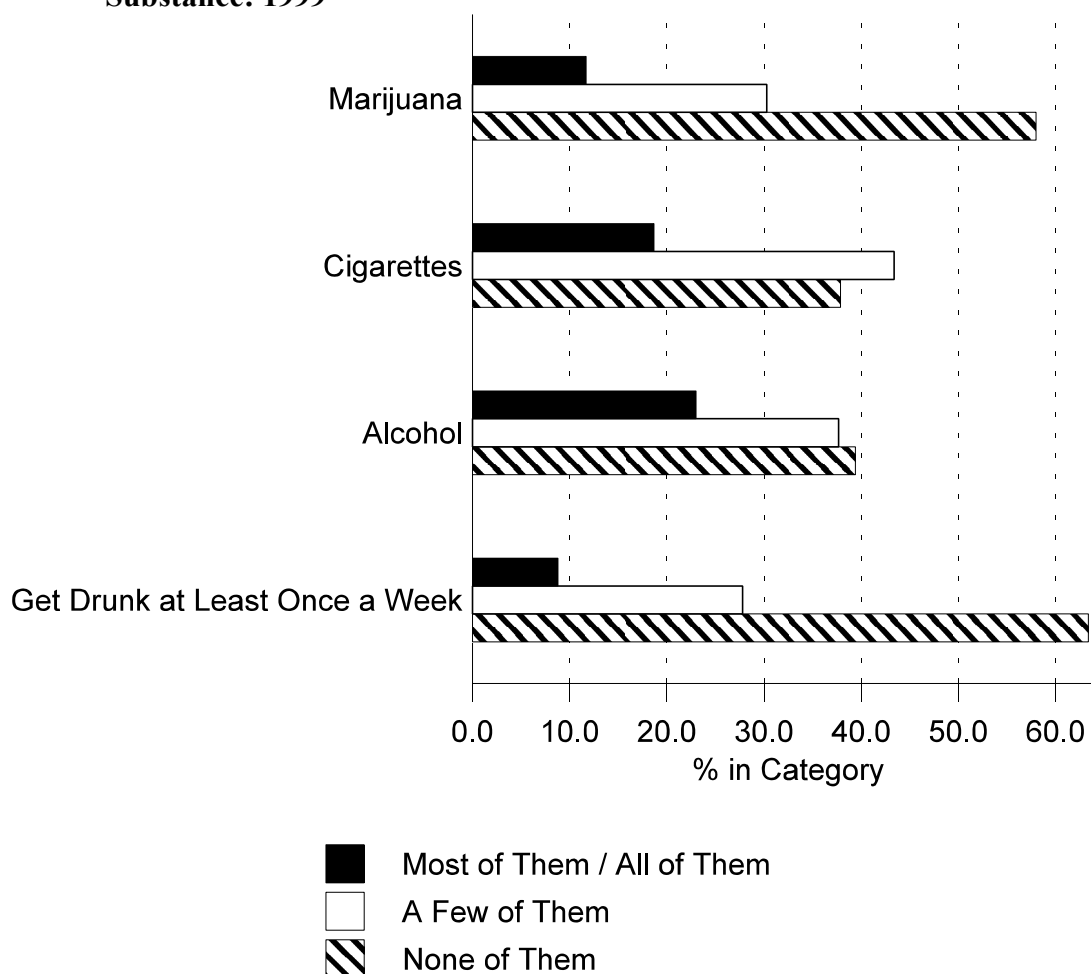
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

using marijuana once or twice a week (56.5 percent) compared with using marijuana once a month (37.2 percent) or having five or more drinks of alcohol once or twice a week (42.0 percent) (Figure 2.11).

2.4.6   Risk-Taking Proclivity

Risk-taking proclivity, a risk factor, focuses on youths' tendencies to engage in high-risk activities. Youths were asked how often they get a real kick out of doing things that are a little dangerous, how often they test themselves by doing something a little risky, and how often they wear a seat belt when riding in the front passenger seat of a car (Table A.3). The response options were 1 ("always"), 2 ("often"), 3 ("seldom"), or 4 ("never").[11] The mean score across the

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[11] These response options were reverse coded for the question about wearing a seatbelt when riding in the front passenger seat of a car.

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Figure 2.11 Percentages of Youths Aged 12 to 17 Who Perceived Great Risk of Substance Use, by Substance: 1999

Substance	% Perceived Great Risk of Use
Marijuana (once a month)	37.2
Marijuana (1 or 2 times a week)	56.5
Cigarettes (1 or more packs a day)	60.7
Alcohol (4 or 5 drinks nearly every day)	63.6
Alcohol (5 or more drinks 1 or 2 times a week)	42.0

% Perceived Great Risk of Use
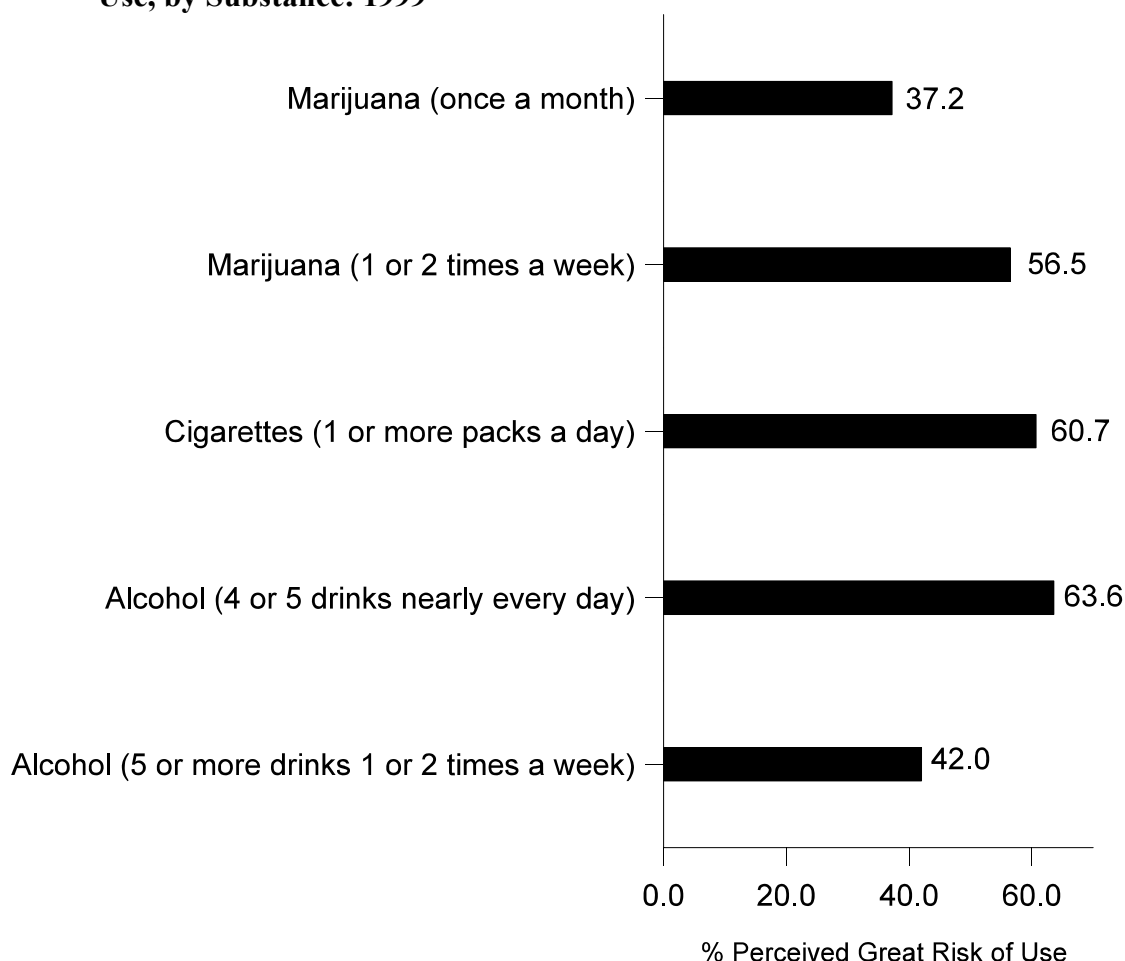
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

three items was 1.95, and the median score was 2.00, which indicates that on average youths sometimes engage in these behaviors (Table 2.3). Among youths, 40.5 percent reported that they sometimes or always get a real kick out of doing things that are a little dangerous, 33.5 percent sometimes or always test themselves by doing something a little risky, and 14.2 percent seldom or never wear a seatbelt when riding in the front passenger seat of a car (Table A.7).

2.4.7 Participation in Extracurricular Activities

Participation in extracurricular activities, a protective factor, was measured by asking youths to select which extracurricular activities they had participated in during the past 12 months (see Table A.3 for the list of possible activities). Among youths, 69.1 percent reported that they had participated in two or more extracurricular activities in the past 12 months (Table A.7).

2.4.8 Religiosity

Religiosity, a protective factor, focuses on the importance of religious beliefs to the respondent. Youths were asked how many times they had attended religious services in the past 12 months ("0 to 5 times," "6 to 24 times," "25 to 52 times," or "more than 52 times," scored 1, 2, 3, and 4, respectively) (Table A.3). Youths were also asked how much they agreed or disagreed that their religious beliefs are a very important part of their life, their religious beliefs influence how they make decisions in their life, and it is important that their friends share their religious beliefs. The response options for these last three questions were 1 ("strongly disagree"), 2 ("somewhat disagree"), 3 ("somewhat agree"), or 4 ("strongly agree"). The mean score across the four items was 2.62, and the median was 2.50 on the scale from 1 (low religiosity) to 4 (high religiosity). Figure 2.12 shows that 40.8 percent of youths reported they had attended church 0 to 5 times in the past 12 months, and 41.9 percent had attended church 25 or more times in the past 12 months. Most youths somewhat or strongly agreed that their religious beliefs are a very important part of their life (80.3 percent) and that religious beliefs influence how they make decisions in their life (72.7 percent). In contrast, only 36.6 percent of youths somewhat or strongly agreed that it is important that their friends share their religious beliefs.

Figure 2.12 Percentages of Youths Aged 12 to 17 with Different Responses to Religiosity Items: 1999
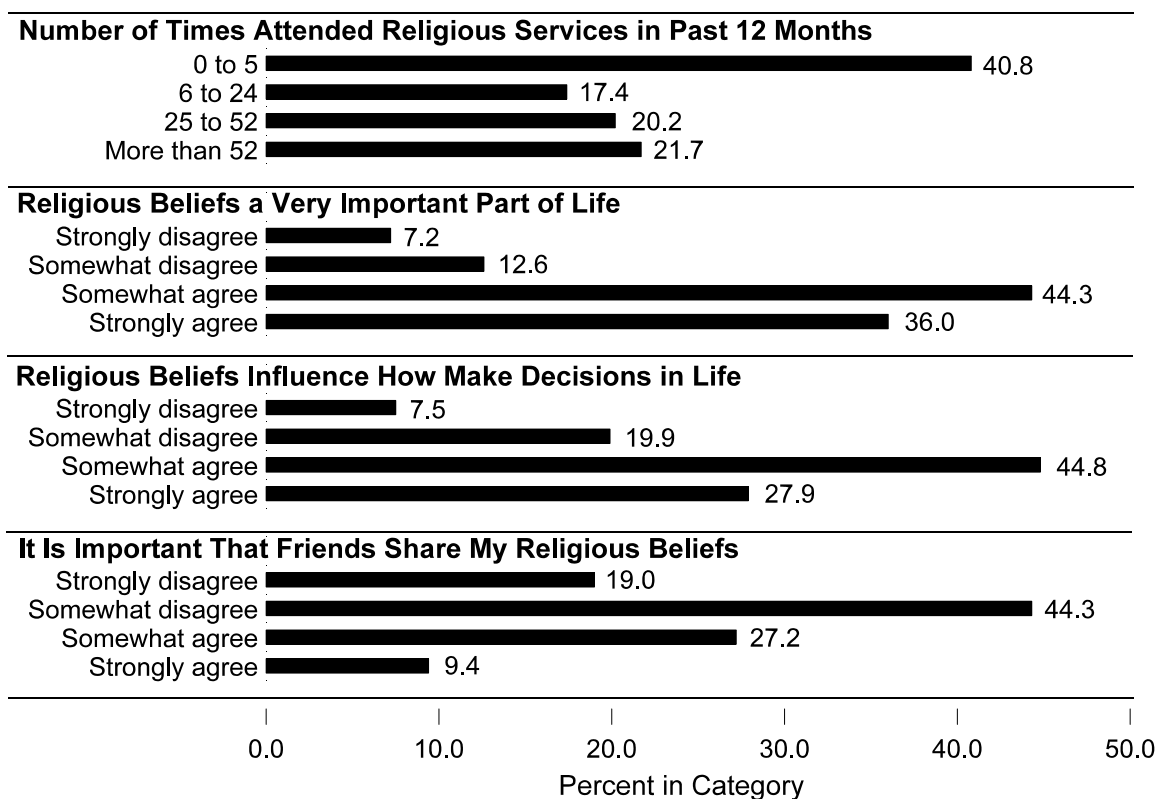
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

2.4.9 Peer/Individual Factors, by Race/Ethnicity, Gender, and Age

Summary statistics for peer/individual factors are presented by racial/ethnic group, gender, and age in Table 2.7.[12] Among youths, whites were the most likely to report participating in two or more extracurricular activities (72.2 percent), followed by blacks (68.3 percent), the "other" category (67.5 percent), and Hispanics (55.2 percent). Scores were approximately equal between racial/ethnic groups on the antisocial behavior, individual attitudes toward substance use, friends' attitudes toward substance use, friends' substance use, perceived risk of substance use, risk-taking proclivity, and religiosity measures.

Compared with females, male youths reported that their friends had more positive attitudes toward substance use (mean = 1.70 for males and 1.52 for females), lower perceived risk of substance use (mean = 1.78 for males and 1.62 for females), and higher risk-taking proclivity (mean = 2.06 for males and 1.83 for females). Males were also less likely than females to have participated in two or more extracurricular activities (65.4 vs. 72.9 percent). No notable differences were found between males and females on other measures (i.e., antisocial behavior, individual attitudes toward substance use, friends' substance use, and religiosity).

Compared with youths aged 12 to 14, youths aged 15 to 17 reported more positive attitudes toward substance use, more positive attitudes toward substance use among their close friends, higher substance use among their friends, lower perceived risk of marijuana use, and less participation in extracurricular activities.

2.5 School Domain

School domain factors included in the 1999 NHSDA included commitment to school, sanctions against substance use at school, perceived prevalence of substance use at school, academic performance, and exposure to prevention messages at school.[13] The individual questions used to create these factors are presented in Table A.4, and the distributions of these items are presented in Table A.8 (see Appendix A). Summary statistics for each of these factors are presented in Table 2.4.

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[12] For more information about distributions of risk and protective factors in the peer/individual domain by gender and age, see Appendix C.

[13] Approximately 25 percent of youths aged 12 to 17 did not answer the questions for the school domain risk and protective factors and thus are not included in these analyses. Analyses in which revised sample weights were computed for the subsample who did complete these questions indicated that these missing cases did not have a significant effect on these measures. See Appendix B for a fuller discussion of these missing values for the school domain questions.

2.5.1 Commitment to School

Commitment to school, a protective factor, focuses on youths' beliefs and feelings about attending school. Youths were asked how much they liked going to school in the past 12 months, how often they felt the schoolwork they had been assigned in the past 12 months was meaningful and important, how important they thought the things they had learned in school in the past 12 months were going to be to them later in life, and how interesting the courses they took during the past 12 months had been. (Table A.4 presents the response options for these questions; all responses were coded so that 1 represented the lowest level of commitment and 4 represented the highest level of commitment.) The mean score across the four items was 3.06 on the scale from 1 (low commitment) to 4 (high commitment), which indicates that youths felt a fairly high commitment to school (Table 2.4). Among youths, 80.2 percent reported that they liked or kind of liked going to school, 78.0 percent sometimes or always felt their schoolwork was meaningful and important, 86.2 reported that they felt the things they have learned in school will be somewhat or very important to them later in life, and 74.9 percent reported that most of their courses at school have been somewhat interesting or very interesting (Figure 2.13).

Figure 2.13 Percentages of Youths Aged 12 to 17 with Different Responses to Commitment to School Items: 1999
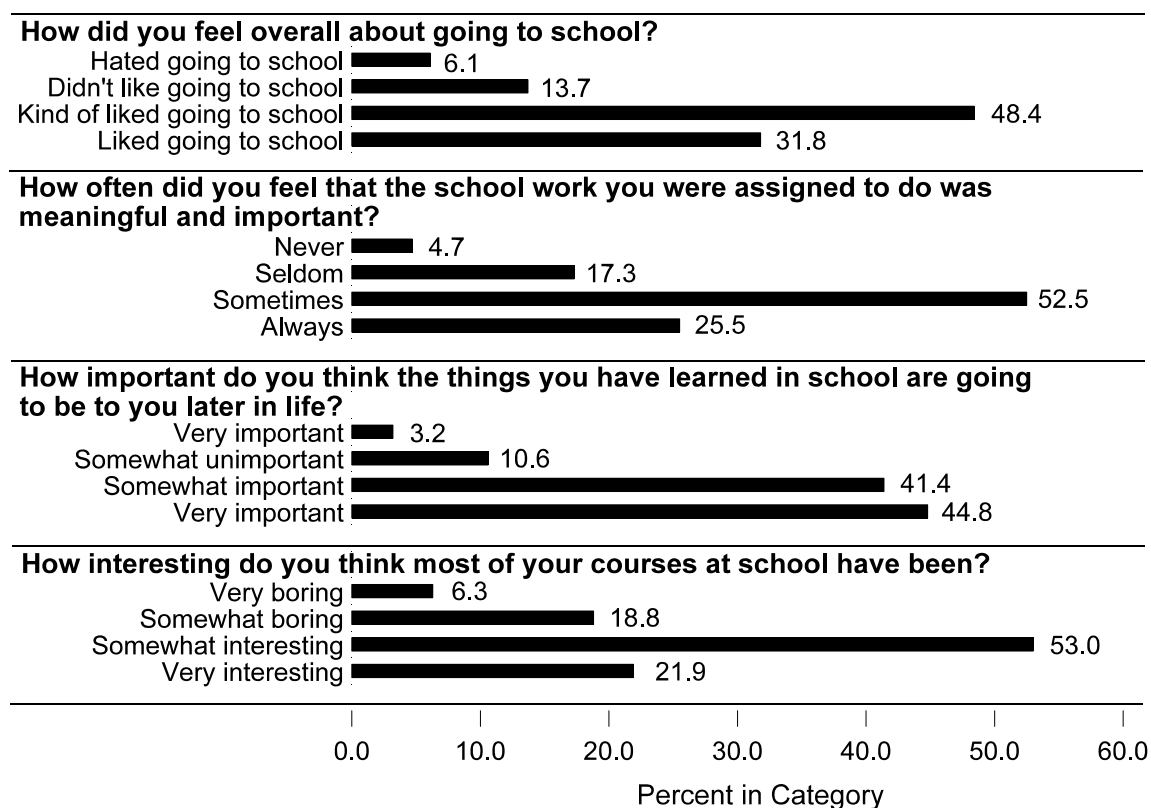
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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2.5.2 Sanctions Against Substance Use

Sanctions against substance use constitute a protective factor focusing on punishment for substance use in a youth's school. Youths were asked how much trouble a student in their grade would be in if he or she was caught using an illegal drug, smoking a cigarette, or drinking an alcoholic beverage (Table A.4). Response options were 1 ("no trouble at all"), 2 ("a little trouble"), or 3 ("a lot of trouble"). The mean score across the three substances was 2.79, and the median was 3.00, indicating that youths believed the students in their grades would be in a lot of trouble if they were caught using these substances at school (Table 2.4). More youths indicated that they would be in a lot of trouble for using an illegal drug (95.1 percent) or drinking alcohol (85.7 percent) in school compared with smoking cigarettes (62.8 percent) (Figure 2.14).

Figure 2.14   Percentages of Youths Aged 12 to 17 Reporting That Youths Would Get in a Lot of Trouble for Substance Use in School, by Substance: 1999
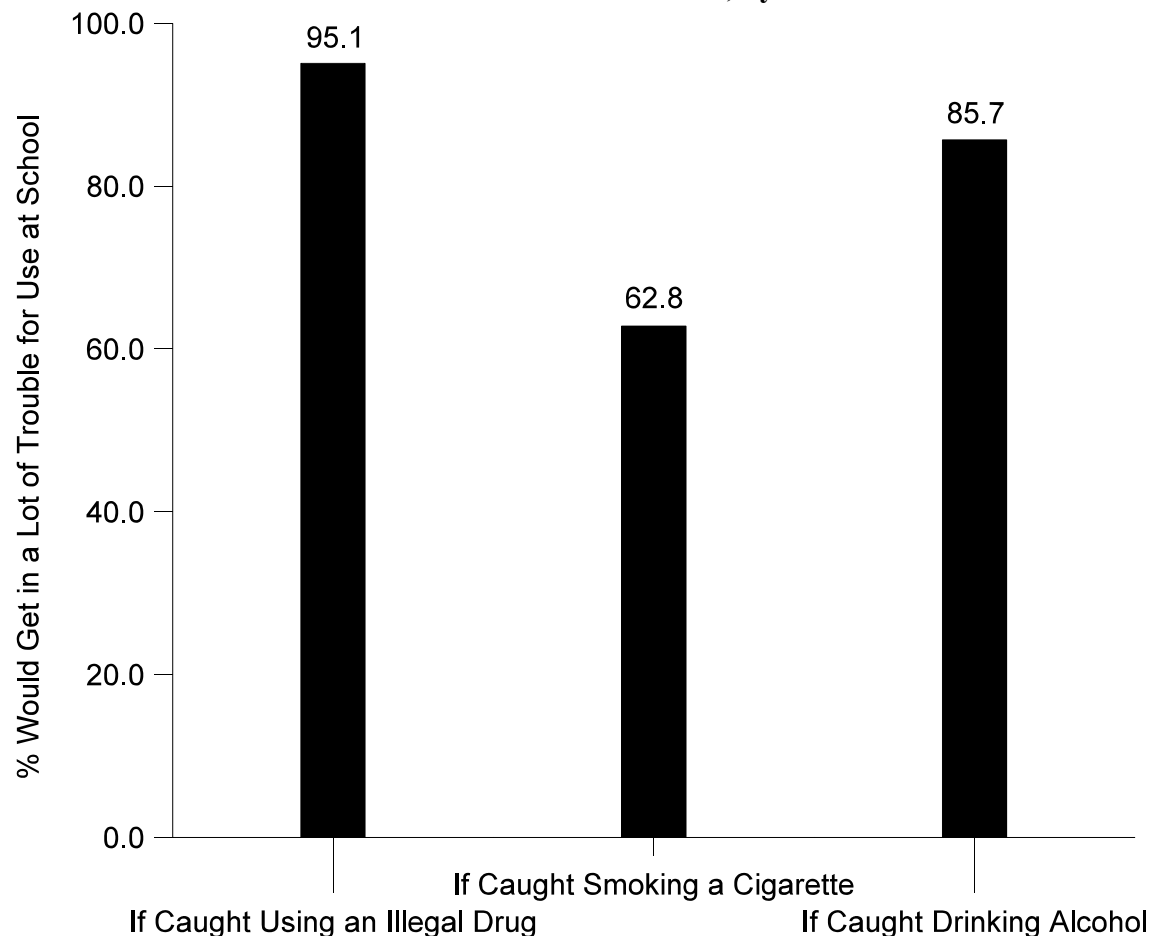
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

2.5.3   Perceived Prevalence of Substance Use

Perceived prevalence of substance use in school, a risk factor, was measured by asking youths how many students in their grade at school used marijuana or hashish, smoked cigarettes, drank alcohol, or got drunk at least once a week (Table A.4). The response options were 1 ("none of them"), 2 ("a few of them"), 3 ("most of them"), or 4 ("all of them"). The mean score across the four questions was 2.10, and the median score was 2.00, which represents "a few of them" on the scale (Table 2.4). More youths reported that most or all of the students in their grade at school used cigarettes (40.0 percent) or alcohol (41.2 percent) than used marijuana (23.4 percent) or got drunk at least once a week (17.3 percent) (Figure 2.15).

Figure 2.15   Percentages of Youths Aged 12 to 17 Reporting Substance Use by Students in Their Grade, by Substance: 1999
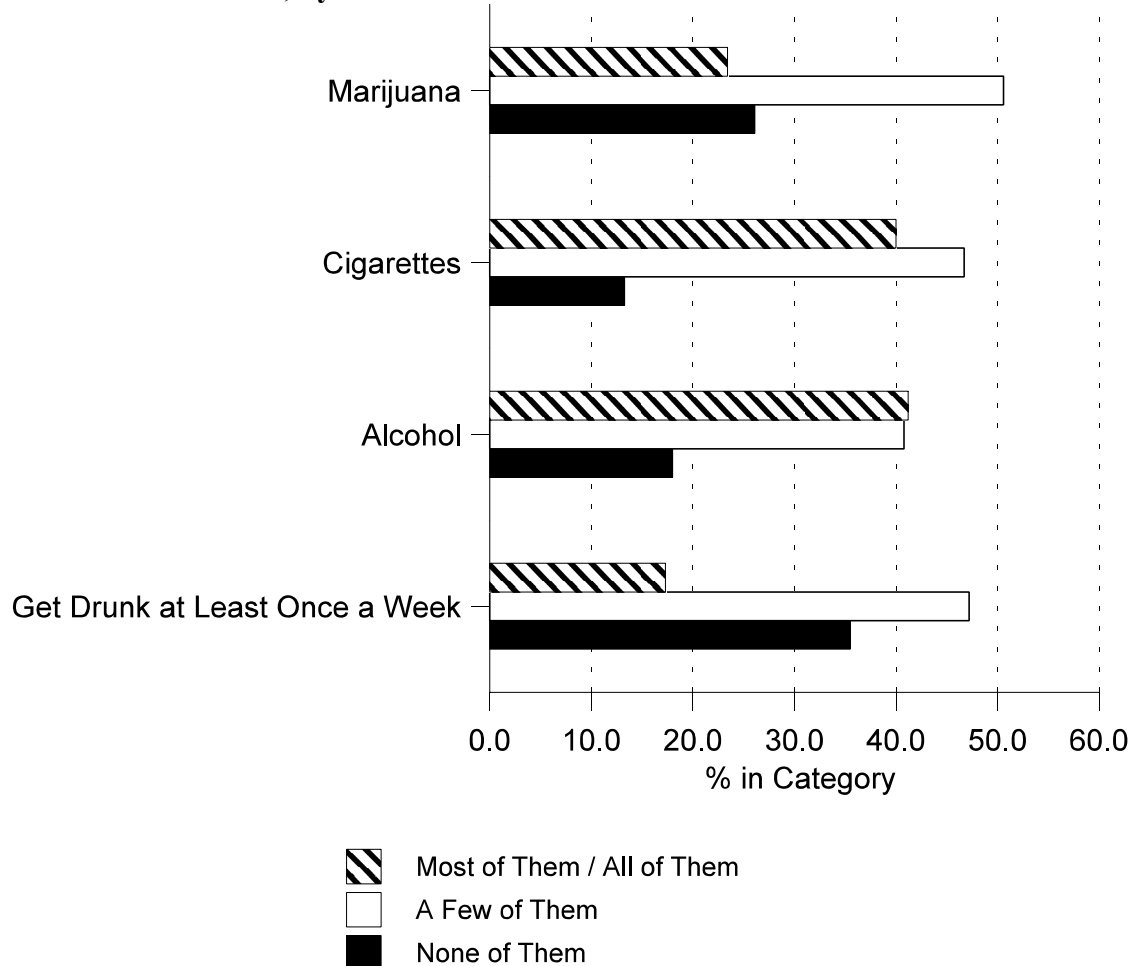
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

2.5.4   Academic Performance

Poor academic performance, a risk factor, was measured by asking youths to report their grades in the last semester that they had completed (Table A.4). Approximately 29 percent of youths who attended schools that give letter grades reported receiving grades of "C" or below in the past semester (Table 2.4).[14]

2.5.5   Exposure to Prevention Messages in School

Exposure to substance abuse prevention messages in school, a protective factor, was measured by asking youths whether in the past 12 months they had received any of the following three types of prevention messages in school: a special class about drugs or alcohol; films, lectures, discussions, or printed information about drugs or alcohol in one of their regular classes, such as health or physical education; or films, lectures, discussions, or printed information about drugs or alcohol outside one of their regular classes, such as in special assemblies (Table A.4). Among youths, 77.4 percent reported that they had been exposed to at least one of these types of prevention messages in school (Table 2.4).

2.5.6   School Factors, by Race/Ethnicity, Gender, and Age

Summary statistics for school factors are presented by racial/ethnic group, gender, and age in Table 2.8.[15] Among youths, whites reported lower commitment to school (mean = 2.99) compared with blacks (mean = 3.24), Hispanics (mean = 3.20), or youths in the "other" category (mean = 3.21). Among youths, 25.8 percent of whites and 21.7 percent of those in the "other" category received grades of "C" or below in their last completed semester compared with 37.0 percent of blacks and 36.9 percent of Hispanics. Black and Hispanic youths were also less likely to report exposure to prevention messages in school (73.5 and 74.6 percent, respectively) compared with whites (78.6 percent) and those in the "other" category (78.7 percent). Scores were not notably different between different racial/ethnic groups for sanctions against substance use or perceived prevalence of substance use.

Among youths, 34.0 percent of males had received grades of "C" or below in the past semester compared with 23.0 percent of females. Males were also less likely than females to report having been exposed to prevention messages at school (74.3 vs. 80.7 percent). Scores

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[14] Approximately 2.3 percent of youths attended schools that did not give letter grades.

[15] For more information about distributions of risk and protective factors in the school domain by gender and age, see Appendix C.

were not notably different between males and females on commitment to school, sanctions against substance use, or perceived prevalence of substance use.

Youths aged 15 to 17 reported less severe sanctions against substance use in school (mean = 2.70) compared with youths aged 12 to 14 (mean = 2.89). This difference was primarily found for sanctions related to smoking cigarettes. Older youths also reported higher prevalence of substance use among students in their grade, lower academic performance, and less exposure to prevention messages in school compared with youths aged 12 to 14.

Table 2.1 Means or Percentages, Standard Deviations, and Quartiles of Youths Aged 12 to 17 Reporting *Community Domain* Risk and Protective Factors: 1999

Community Domain[1]	Risk/ Protective Factors	Number of Items	Sample Size	Scale Range	Mean or Percentage[2]	Standard Deviation	Quartiles 25%	50%	75%	Cronbach's Alpha Reliability[3]
Community Disorganization and Crime	Risk	6	25,108	1-4[4]	1.65	0.63	1.17	1.50	2.00	0.79
Neighborhood Cohesiveness	Protective	2	25,021	1-4[4]	2.99	0.76	2.50	3.00	3.50	0.55
Community Attitudes Toward Substance Use	Risk									
Multiple substance scale[5]		3	24,508	1-3[6]	1.42	0.62	1.00	1.00	1.67	0.84
Marijuana (trying once or twice)		1	24,473	1-3[6]	1.31	0.65	1.00	1.00	1.00	--
Cigarettes (1 or more packs a day)		1	24,386	1-3[6]	1.52	0.77	1.00	1.00	2.00	--
Alcohol (1 or 2 drinks every day)		1	24,493	1-3[6]	1.43	0.71	1.00	1.00	2.00	--
Community Norms Toward Substance Use	Risk									
Multiple substance scale[5]		4	25,100	1-4[7]	1.88	0.50	1.50	1.75	2.25	0.70
Marijuana		1	24,667	1-4[7]	1.33	0.58	1.00	1.00	2.00	--
Cigarettes		1	25,104	1-4[7]	2.20	0.66	2.00	2.00	3.00	--
Alcohol		2	24,525	1-4[7]	1.98	0.63	1.50	2.00	2.50	0.56
Availability of Illicit Drugs	Risk									
Marijuana		1	24,405	1-5[8]	3.41	1.47	2.00	4.00	5.00	--
LSD		1	23,473	1-5[8]	2.46	1.31	1.00	2.00	3.00	--
Cocaine		1	23,829	1-5[8]	2.55	1.35	1.00	2.00	4.00	--
Crack		1	23,871	1-5[8]	2.57	1.37	1.00	2.00	4.00	--
Heroin		1	23,706	1-5[8]	2.23	1.26	1.00	2.00	3.00	--
Exposed to Prevention Messages in the Media	Protective	1	25,037	--	Yes=82.3%	0.32	--	--	--	–

[1] Specific questions and distributions for community domain constructs are presented in Tables A.1 and A.5 (see Appendix A).

[2] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).

[3] Cronbach's alpha is a measure of the internal consistency of the individual items used to create multiple-item scales and is a function of the average intercorrelation between the items as well as the number of items. Cronbach's alpha values range from 0 (no correlation between items) and 1 (perfect correlation between items).

[4] Response options were 1 = Strongly disagree, 2 = Somewhat disagree, 3 = Somewhat agree, and 4 = Strongly agree.

[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

[6] Response options were 1 = Strongly disapprove, 2 = Somewhat disapprove, and 3 = Neither approve nor disapprove.

[7] Response options were 1 = None, 2 = Some, 3 = Most, and 4 = All.

[8] Response options were 1 = Probably impossible, 2 = Very difficult, 3 = Somewhat difficult, 4 = Somewhat easy, and 5 = Very easy.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 2.2   Means or Percentages, Standard Deviations, and Quartiles of Youths Aged 12 to 17 Reporting *Family Domain* Risk and Protective Factors: 1999

Family Domain[1]	Risk/ Protective Factors	Number of Items	Sample Size	Scale Range	Mean or Percentage[2]	Standard Deviation	Quartiles			Cronbach's Alpha Reliability[3]
							25%	50%	75%	
Parental Monitoring	Risk	5	19,262	1-4[4]	2.00	0.60	1.60	2.00	2.40	0.62
Parental Encouragement	Protective	2	25,163	1-4[5]	3.34	0.77	3.00	3.50	4.00	0.86
Parental Attitudes Toward Substance Use	Risk									
Multiple substance scale[6]		3	24,972	1-3[7]	1.16	0.41	1.00	1.00	1.00	0.83
Marijuana (try once or twice)		1	24,949	1-3[7]	1.14	0.46	1.00	1.00	1.00	--
Cigarettes (1 or more packs a day)		1	24,938	1-3[7]	1.19	0.53	1.00	1.00	1.00	--
Alcohol (1 or 2 drinks a day)		1	24,960	1-3[7]	1.15	0.46	1.00	1.00	1.00	--
Parents Communicate About Substance Use	Protective	1	24,994	--	Yes=57.4%	0.40	--	--	--	–
Parents Are Source of Social Support	Protective	Checklist	25,051	--	Yes=71.7%	0.35	--	--	--	--

[1] Specific questions and distributions for family domain constructs are presented in Tables A.2 and A.6 (see Appendix A).

[2] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).

[3] Cronbach's alpha is a measure of the internal consistency of the individual items used to create multiple-item scales and is a function of the average intercorrelation between the items as well as the number of items. Cronbach's alpha values range from 0 (no correlation between items) and 1 (perfect correlation between items).

[4] Response options were 1 = Always, 2 = Sometimes, 3 = Seldom, and 4 = Never.

[5] Response options were 1 = Never, 2 = Seldom, 3 = Sometimes, and 4 = Always.

[6] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

[7] Response options were 1 = Strongly disapprove, 2 = Somewhat disapprove, and 3 = Neither approve nor disapprove.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 2.3 Means or Percentages, Standard Deviations, and Quartiles of Youths Aged 12 to 17 Reporting *Peer/Individual Domain* Risk and Protective Factors: 1999

Peer/Individual Domain[1]	Risk/ Protective Factors	Number of Items	Sample Size	Scale Range	Mean or Percentage[2]	Standard Deviation	Quartiles 25%	50%	75%	Cronbach's Alpha Reliability[3]
Antisocial Behavior	Risk	6	25,170	1-5[4]	1.15	0.33	1.00	1.00	1.17	0.74
Individual Attitudes Toward Substance Use	Risk									
Multiple substance scale[5]		3	25,967	1-3[6]	1.55	0.70	1.00	1.00	2.00	0.87
Marijuana (try once or twice)		1	24,938	1-3[6]	1.57	0.78	1.00	1.00	2.00	--
Cigarettes (1 or more packs a day)		1	24,955	1-3[6]	1.55	0.81	1.00	1.00	2.00	--
Alcohol (1 or 2 drinks a day)		1	24,953	1-3[6]	1.55	0.78	1.00	1.00	2.00	--
Friends' Attitudes Toward Substance Use	Risk									
Multiple substance scale[5]		3	24,847	1-3[6]	1.61	0.73	1.00	1.33	2.00	0.89
Marijuana (try once or twice)		1	24,833	1-3[6]	1.58	0.81	1.00	1.00	2.00	--
Cigarettes (1 or more packs a day)		1	24,829	1-3[6]	1.65	0.81	1.00	1.50	2.00	--
Alcohol (1 or 2 drinks a day)		1	24,824	1-3[6]	1.61	0.81	1.00	1.00	2.00	--
Friends' Substance Use	Risk									
Multiple substance scale[5]		4	24,940	1-4[7]	1.69	0.67	1.00	1.50	2.00	0.88
Marijuana		1	24,798	1-4[7]	1.56	0.75	1.00	1.00	2.00	--
Cigarettes		1	24,953	1-4[7]	1.84	0.79	1.00	2.00	2.00	--
Alcohol		2	24,646	1-4[7]	1.68	0.73	1.00	1.50	2.00	0.82
Perceived Risk of Substance Use	Risk									
Multiple substance scale[5]		5	24,910	1-4[8]	1.70	0.60	1.20	1.60	2.00	0.84
Marijuana		2	24,547	1-4[8]	1.83	0.85	1.00	1.50	2.50	0.84
Cigarettes		1	24,780	1-4[8]	1.51	0.73	1.00	1.00	2.00	--
Alcohol		2	24,790	1-4[8]	1.66	0.70	1.00	1.50	2.00	0.73
Risk-Taking Proclivity	Risk	3	25,169	1-4[8]	1.95	0.66	1.33	2.00	2.33	0.59
Participation in Two or More Extracurricular Activities	Protective	Checklist	25,216	--	Yes=69.1%	0.38	--	--	--	--
Religiosity	Protective	4	25,117	1-4[9]	2.63	0.73	2.00	2.50	3.25	0.77

[1] Specific questions and distributions for peer/individual domain constructs are presented in Tables A.3 and A.7 (see Appendix A).

[2] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).

[3] Cronbach's alpha is a measure of the internal consistency of the individual items used to create multiple-item scales and is a function of the average intercorrelation between the items as well as the number of items. Cronbach's alpha values range from 0 (no correlation between items) and 1 (perfect correlation between items).

[4] Response options were 1 = 0 times, 2 = 1 or 2 times, 3 = 3 to 5 times, 4 = 6 to 9 times, and 5 = 10 or more times.

[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

[6] Response options were 1 = Strongly disapprove, 2 = Somewhat disapprove, and 3 = Neither approve nor disapprove.

[7] Response options were 1 = None, 2 = Some, 3 = Most, and 4 = All.

[8] Response options were 1 = Great risk, 2 = Moderate risk, 3 = Slight risk, and 4 = No risk.

[9] Response options for number of times attending religious services in the past 12 months were 1 = 0 to 5 times, 2 = 6 to 24 times, 3 = 25 to 52 times, and 4 = More than 52 times. For other items, response options were 1 = Strongly disagree, 2 = Somewhat disagree, 3 = Somewhat agree, and 4 = Strongly agree.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 2.4   Means or Percentages, Standard Deviations, and Quartiles of Youths Aged 12 to 17 Reporting *School Domain* Risk and Protective Factors: 1999

School Domain[1]	Risk/ Protective Factors	Number of Items	Sample Size	Scale Range	Mean or Percentage[2]	Standard Deviation	Quartiles 25%	50%	75%	Cronbach's Alpha Reliability[3]
Commitment to School	Protective	4	19,290	1-4[4]	3.06	0.62	2.75	3.00	3.50	0.78
Sanctions Against Substance Use at School	Protective									
Multiple substance scale[5]		3	19,157	1-3[6]	2.79	0.33	2.67	3.00	3.00	0.70
Illegal drugs		1	19,173	1-3[6]	2.94	0.28	3.00	3.00	3.00	--
Cigarettes		1	19,125	1-3[6]	2.58	0.57	2.00	3.00	3.00	--
Alcohol		1	19,139	1-3[6]	2.84	0.40	3.00	3.00	3.00	--
Perceived Prevalence of Substance Use	Risk									
Multiple substance scale[5]		4	18,765	1-4[7]	2.10	0.64	1.75	2.00	2.50	0.89
Marijuana		1	18,488	1-4[7]	1.99	0.73	1.00	2.00	2.00	--
Cigarettes		1	18,888	1-4[7]	2.29	0.71	2.00	2.00	3.00	--
Alcohol		2	18,229	1-4[7]	2.05	0.71	1.50	2.00	2.50	0.83
Academic Performance	Risk	1	18,976	--		–	–	–	--	–
A+ / A / A-					28.5%	0.47				
B+ / B / B-					41.5%	0.48				
C+ / C / C-					22.2%	0.40				
D / less than D average					5.9%	0.22				
School does not give such grade					2.0%	0.14				
Exposed to Prevention Messages in School	Protective	3	19,510	--	Yes=77.4%	0.38	--	--	--	--

[1] Specific questions and distributions for school domain constructs are presented in Tables A.4 and A.8 (see Appendix A).

[2] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).

[3] Cronbach's alpha is a measure of the internal consistency of the individual items used to create multiple-item scales and is a function of the average intercorrelation between the items as well as the number of items. Cronbach's alpha values range from 0 (no correlation between items) and 1 (perfect correlation between items).

[4] Response options for overall feelings toward school were 1 = Hated going to school, 2 = Didn't like going to school, 3 = Kind of liked going to school, and 4 = Liked going to school. Response options for belief about the meaningfulness and importance of school work were 1 = Never, 2 = Seldom, 3 = Sometimes, and 4 = Always. Response options for importance of school work to later life were 1 = Very unimportant, 2 = Somewhat unimportant, 3 = Somewhat important, and 4 = Very important. Response options for interest in courses at school were 1 = Very boring, 2 = Somewhat boring, 3 = Somewhat interesting, and 4 = Very interesting.

[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

[6] Response options were 1 = Strongly disapprove, 2 = Somewhat disapprove, and 3 = Neither approve nor disapprove.

[7] Response options were 1 = None, 2 = Some, 3 = Most, and 4 = All.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 2.5 Means or Percentages and Standard Deviations of *Community Domain* Risk and Protective Factors among Youths Aged 12 to 17, by Race/Ethnicity, Gender, and Age: 1999

Community Domain	Race/Ethnicity					Gender			Age in Years		
	Mean or Percentage[1] (Standard Deviation)					Mean or Percentage[1] (Standard Deviation)			Mean or Percentage[1] (Standard Deviation)		
	White	Black	Hispanic	Other[2]	*p* value[3]	Males	Females	*p* value[4]	12 - 14	15 - 17	*p* value[4]
Community Disorganization and Crime	1.55	1.97	1.83	1.67		1.67	1.64		1.65	1.66	
	(0.55)	(0.78)	(0.69)	(0.63)	<.0001	(0.64)	(0.61)	.0006	(0.63)	(0.63)	.0782
Neighborhood Cohesiveness	3.07	2.85	2.80	2.90		2.97	3.01		3.05	2.93	
	(0.73)	(0.82)	(0.79)	(0.75)	<.0001	(0.76)	(0.76)	<.0001	(0.74)	(0.78)	<.0001
Community Attitudes Toward Substance Use											
Multiple substance scale[5]	1.37	1.50	1.57	1.42		1.43	1.41		1.30	1.54	
	(0.56)	(0.71)	(0.71)	(0.65)	<.0001	(0.62)	(0.61)	.0057	(0.54)	(0.66)	<.0001
Marijuana (trying once or twice)	1.26	1.43	1.46	1.31		1.32	1.30		1.22	1.40	
	(0.58)	(0.77)	(0.76)	(0.68)	<.0001	(0.65)	(0.64)	.0224	(0.56)	(0.71)	<.0001
Cigarettes (1+ pack per day)	1.47	1.60	1.65	1.53		1.52	1.52		1.35	1.68	
	(0.73)	(0.83)	(0.84)	(0.80)	<.0001	(0.76)	(0.77)	.8837	(0.67)	(0.82)	<.0001
Alcohol (1 or 2 drinks every day)	1.38	1.49	1.61	1.42		1.45	1.40		1.32	1.53	
	(0.66)	(0.78)	(0.80)	(0.73)	<.0001	(0.72)	(0.70)	<.0001	(0.63)	(0.76)	<.0001
Community Norms Toward Substance Use											
Multiple substance scale[5]	1.88	1.93	1.86	1.77		1.88	1.88		1.80	1.96	
	(0.48)	(0.57)	(0.53)	(0.52)	<.0001	(0.50)	(0.50)	.6461	(0.47)	(0.52)	<.0001
Marijuana	1.31	1.49	1.34	1.24		1.33	1.33		1.22	1.44	
	(0.55)	(0.70)	(0.60)	(0.55)	<.0001	(0.58)	(0.58)	.8472	(0.50)	(0.63)	<.0001
Cigarettes	2.22	2.26	2.08	2.10		2.18	2.22		2.16	2.24	
	(0.65)	(0.70)	(0.67)	(0.67)	<.0001	(0.65)	(0.66)	<.0001	(0.65)	(0.67)	<.0001
Alcohol	1.99	1.98	1.99	1.86		1.98	1.97		1.89	2.06	
	(0.60)	(0.71)	(0.66)	(0.62)	<.0001	(0.63)	(0.62)	.2483	(0.60)	(0.64)	<.0001
Availability of Illicit Drugs	3.45	3.41	3.34	3.05		3.42	3.41		2.82	3.99	
	(1.43)	(1.56)	(1.50)	(1.50)	<.0001	(1.48)	(1.45)	.5653	(1.45)	(1.22)	<.0001
Exposed to Prevention Messages in the Media	83.5%	78.3%	78.7%	86.2%		80.0%	84.6%		82.3%	82.2%	
	(0.35)	(0.94)	(0.91)	(1.50)	<.0001	(0.45)	(0.42)	<.0001	(0.44)	(0.44)	.8892

Note: Care should be taken in interpreting statistically significant differences in this table. With large sample sizes, very small differences between groups can reach statistical significance.

[1] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).

[2] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[3] *p* value derived from F-tests for continuous variables and chi-square tests (df = 3) for dichotomous variables.

[4] *p* values derived from t-tests for continuous variables and chi-square tests (df = 1) for dichotomous variables.

[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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Table 2.6 Means or Percentages and Standard Deviations of *Family Domain* Risk and Protective and Protective Factors among Youths Aged 12 to 17, by Race/Ethnicity, Gender, and Age: 1999

Family Domain	Race/Ethnicity					Gender			Age in Years		
	Mean or Percentage[1] (Standard Deviation)					Mean or Percentage[1] (Standard Deviation)			Mean or Percentage[1] (Standard Deviation)		
	White	Black	Hispanic	Other[2]	*p* value[3]	Males	Females	*p* value[4]	12 - 14	15 - 17	*p* value[4]
Parental Monitoring	2.02	1.94	2.01	2.00		2.02	1.99		1.85	2.14	
	(0.60)	(0.60)	(0.61)	(0.62)	<.0001	(0.60)	(0.60)	.0077	(0.54)	(0.61)	<.0001
Parental Encouragement	3.37	3.31	3.27	3.20		3.34	3.34		3.43	3.25	
	(0.75)	(0.81)	(0.82)	(0.83)	<.0001	(0.77)	(0.78)	.7953	(0.72)	(0.81)	<.0001
Parental Attitudes Toward Substance Use											
Multiple substance scale[5]	1.14	1.22	1.18	1.16		1.17	1.14		1.12	1.20	
	(0.38)	(0.52)	(0.46)	(0.47)	<.0001	(0.44)	(0.39)	<.0001	(0.38)	(0.45)	<.0001
Marijuana (try once or twice)	1.12	1.20	1.15	1.14		1.15	1.12		1.10	1.17	
	(0.43)	(0.55)	(0.49)	(0.50)	<.0001	(0.48)	(0.44)	<.0001	(0.41)	(0.50)	<.0001
Cigarettes (1 or more packs a day)	1.18	1.25	1.19	1.18		1.20	1.18		1.13	1.25	
	(0.51)	(0.61)	(0.55)	(0.56)	<.0001	(0.54)	(0.52)	.0072	(0.46)	(0.59)	<.0001
Alcohol (1 or 2 drinks a day)	1.13	1.19	1.19	1.15		1.17	1.13		1.12	1.18	
	(0.42)	(0.55)	(0.52)	(0.51)	<.0001	(0.48)	(0.43)	<.0001	(0.41)	(0.50)	<.0001
Parents Communicate About Substance Use	59.9%	47.3%	57.9%	51.1%		55.0%	60.0%		58.8%	55.9%	
	(0.47)	(1.15)	(1.07)	(2.01)	<.0001	(0.55)	(0.55)	<.0001	(0.55)	(0.56)	.0168
Parents Are Source of Social Support	72.8%	71.5%	69.2%	64.3%		72.5%	70.8%		76.3%	67.0%	
	(0.42)	(1.00)	(1.03)	(1.99)	.0018	(0.50)	(0.52)	.1271	(0.49)	(0.54)	<.0001

Note: Care should be taken in interpreting statistically significant differences in this table. With large sample sizes, very small differences between groups can reach statistical significance.

[1] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).

[2] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[3] *p* value derived from F-tests for continuous variables and chi-square tests (df = 3) for dichotomous variables.

[4] *p* values derived from t-tests for continuous variables and chi-square tests (df = 1) for dichotomous variables.

[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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Table 2.7 Means or Percentages and Standard Deviations of *Peer/Individual Domain* Risk and Protective Factors among Youths Aged 12 to 17, by Race/Ethnicity, Gender, and Age: 1999

Peer/Individual Domain	Race/Ethnicity					Gender			Age in Years		
	Mean or Percentage[1] (Standard Deviation)					Mean or Percentage[1] (Standard Deviation)			Mean or Percentage[1] (Standard Deviation)		
	White	Black	Hispanic	Other[2]	p value[3]	Males	Females	p value[4]	12 - 14	15 - 17	p value[4]
Antisocial Behavior	1.14 (0.32)	1.17 (0.37)	1.17 (0.39)	1.11 (0.32)	<.0001	1.19 (0.40)	1.10 (0.24)	<.0001	1.13 (0.29)	1.16 (0.38)	<.0001
Individual Attitudes Toward Substance Use											
Multiple substance scale[5]	1.55 (0.70)	1.55 (0.73)	1.59 (0.72)	1.48 (0.71)	.0047	1.61 (0.74)	1.50 (0.67)	<.0001	1.40 (0.63)	1.71 (0.74)	<.0001
Marijuana (try once or twice)	1.57 (0.80)	1.57 (0.83)	1.59 (0.81)	1.50 (0.80)	.0116	1.62 (0.82)	1.52 (0.79)	<.0001	1.37 (0.69)	1.77 (0.87)	<.0001
Cigarettes (1 or more packs a day)	1.55 (0.78)	1.55 (0.80)	1.58 (0.80)	1.48 (0.77)	.0010	1.59 (0.80)	1.50 (0.76)	<.0001	1.41 (0.71)	1.68 (0.83)	<.0001
Alcohol (1 or 2 drinks a day)	1.55 (0.78)	1.54 (0.80)	1.60 (0.80)	1.47 (0.77)	<.0001	1.62 (0.81)	1.47 (0.75)	<.0001	1.41 (0.70)	1.69 (0.83)	<.0001
Friends' Attitudes Toward Substance Use											
Multiple substance scale[5]	1.62 (0.73)	1.62 (0.76)	1.61 (0.74)	1.51 (0.72)	.1521	1.70 (0.76)	1.52 (0.69)	<.0001	1.43 (0.65)	1.79 (0.76)	<.0001
Marijuana (try once or twice)	1.58 (0.81)	1.60 (0.83)	1.57 (0.81)	1.48 (0.80)	.0002	1.65 (0.84)	1.50 (0.79)	<.0001	1.37 (0.69)	1.78 (0.87)	<.0001
Cigarettes (1 or more packs a day)	1.65 (0.82)	1.66 (0.84)	1.63 (0.82)	1.53 (0.80)	<.0001	1.73 (0.84)	1.56 (0.79)	<.0001	1.48 (0.73)	1.81 (0.86)	<.0001
Alcohol (1 or 2 drinks a day)	1.61 (0.80)	1.60 (0.81)	1.62 (0.81)	1.52 (0.80)	.0003	1.71 (0.76)	1.50 (0.83)	<.0001	1.44 (0.72)	1.77 (0.85)	<.0001
Friends' Substance Use											
Multiple substance scale[5]	1.70 (0.67)	1.61 (0.64)	1.72 (0.69)	1.60 (0.68)	<.0001	1.68 (0.67)	1.69 (0.67)	.3779	1.42 (0.54)	1.96 (0.68)	<.0001
Marijuana	1.55 (0.74)	1.57 (0.79)	1.63 (0.78)	1.47 (0.75)	<.0001	1.57 (0.76)	1.54 (0.75)	.0073	1.31 (0.59)	1.80 (0.81)	<.0001
Cigarettes	1.87 (0.80)	1.74 (0.76)	1.81 (0.77)	1.74 (0.82)	<.0001	1.83 (0.78)	1.84 (0.81)	.2940	1.59 (0.71)	2.08 (0.79)	<.0001
Alcohol	1.70 (0.73)	1.56 (0.68)	1.71 (0.74)	1.58 (0.70)	<.0001	1.67 (0.73)	1.69 (0.72)	.0173	1.39 (0.57)	1.97 (0.75)	<.0001

Table 2.7 (continued)

Peer/Individual Domain	Race/Ethnicity					Gender			Age in Years		
	Mean or Percentage[1] (Standard Deviation)					Mean or Percentage[1] (Standard Deviation)			Mean or Percentage[1] (Standard Deviation)		
	White	Black	Hispanic	Other[2]	*p* value[3]	Males	Females	*p* value[4]	12 - 14	15 - 17	*p* value[4]
Perceived Risk of Substance Use											
Multiple substance scale[5]	1.69	1.70	1.74	1.69		1.78	1.62		1.64	1.76	
	(0.57)	(0.67)	(0.64)	(0.65)	.0015	(0.63)	(0.56)	<.0001	(0.58)	(0.61)	<.0001
Marijuana	1.81	1.91	1.89	1.83		1.90	1.76		1.68	1.98	
	(0.82)	(0.92)	(0.88)	(0.88)	<.0001	(0.90)	(0.80)	<.0001	(0.77)	(0.89)	<.0001
Cigarettes	1.50	1.56	1.54	1.53		1.57	1.45		1.52	1.51	
	(0.68)	(0.86)	(0.78)	(0.76)	<.0001	(0.76)	(0.69)	<.0001	(0.74)	(0.72)	.0336
Alcohol	1.68	1.57	1.68	1.62		1.76	1.56		1.65	1.68	
	(0.68)	(0.75)	(0.73)	(0.74)	<.0001	(0.75)	(0.64)	<.0001	(0.70)	(0.71)	.0009
Risk-Taking Proclivity	2.00	1.80	1.88	1.80		2.06	1.83		1.87	2.05	
	(0.66)	(0.65)	(0.67)	(0.65)	<.0001	(0.68)	(0.63)	<.0001	(0.65)	(0.67)	<.0001
Participated in Two or More Extracurricular Activities	72.2%	68.3%	55.2%	67.5%		65.4%	72.9%		72.4%	65.7%	
	(0.45)	(1.09)	(1.08)	(1.87)	<.0001	(0.54)	(0.50)	<.0001	(0.50)	(0.55)	<.0001
Religiosity	2.60	2.75	2.62	2.56		2.57	2.69		2.70	2.55	
	(0.75)	(0.69)	(0.66)	(0.70)	<.0001	(0.74)	(0.72)	<.0001	(0.71)	(0.75)	<.0001

Note: Care should be taken in interpreting statistically significant differences in this table. With large sample sizes, very small differences between groups can reach statistical significance.

[1] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).

[2] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[3] *p* value derived from F-tests for continuous variables and chi-square tests (df = 3) for dichotomous variables.

[4] *p* values derived from t-tests for continuous variables and chi-square tests (df = 1) for dichotomous variables.

[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 2.8   Means or Percentages and Standard Deviations of *School Domain* Risk and Protective and Factors among Youths Aged 12 to 17, by Race/Ethnicity, Gender, and Age: 1999

School Domain	Race/Ethnicity Mean or Percentage[1] (Standard Deviation)					Gender Mean or Percentage[1] (Standard Deviation)			Age in Years Mean or Percentage[1] (Standard Deviation)		
	White	Black	Hispanic	Other[2]	*p* value[3]	Males	Females	*p* value[4]	12 - 14	15 - 17	*p* value[4]
Commitment to School	2.99	3.24	3.20	3.21		3.00	3.12		3.12	3.00	
	(0.62)	(0.57)	(0.60)	(0.58)	<.0001	(0.64)	(0.59)	<.0001	(0.61)	(0.63)	.0002
Sanctions Against Substance Use at School											
Multiple substance scale[5]	2.78	2.80	2.80	2.83		2.79	2.79		2.89	2.70	
	(0.33)	(0.35)	(0.36)	(0.33)	.0012	(0.34)	(0.32)	.6345	(0.27)	(0.36)	<.0001
Illegal drugs	2.94	2.93	2.92	2.96		2.93	2.95		2.96	2.92	
	(0.27)	(0.30)	(0.33)	(0.27)	.0008	(0.29)	(0.27)	.0004	(0.23)	(0.32)	<.0001
Cigarettes	2.57	2.63	2.62	2.65		2.59	2.58		2.80	2.40	
	(0.57)	(0.56)	(0.59)	(0.55)	<.0001	(0.58)	(0.57)	.1510	(0.23)	(0.32)	<.0001
Alcohol	2.84	2.84	2.84	2.87		2.84	2.85		2.90	2.80	
	(0.40)	(0.42)	(0.42)	(0.39)	.1588	(0.41)	(0.39)	.3846	(0.33)	(0.45)	<.0001
Perceived Prevalence of Substance Use											
Multiple substance scale[5]	2.11	2.08	2.08	1.98		2.05	2.15		1.75	2.39	
	(0.63)	(0.68)	(0.68)	(0.66)	<.0001	(0.64)	(0.64)	<.0001	(0.58)	(0.54)	<.0001
Marijuana	1.98	2.07	2.03	1.89		1.96	2.02		1.65	2.27	
	(0.70)	(0.84)	(0.78)	(0.73)	<.0001	(0.73)	(0.74)	<.0001	(0.67)	(0.66)	<.0001
Cigarettes	2.31	2.29	2.23	2.16		2.23	2.34		2.00	2.53	
	(0.70)	(0.76)	(0.74)	(0.72)	<.0001	(0.71)	(0.71)	<.0001	(0.70)	(0.62)	<.0001
Alcohol	2.08	1.98	2.04	1.94		2.00	2.11		1.67	2.37	
	(0.69)	(0.74)	(0.74)	(0.73)	<.0001	(0.70)	(0.71)	<.0001	(0.62)	(0.61)	<.0001
Academic Performance											
A+ / A / A-	32.1%	16.4%	20.2%	40.5%		23.9%	34.4%		32.9%	25.7%	
	(0.57)	(1.02)	(1.18)	(2.56)	<.0001	(0.61)	(0.68)	<.0001	(0.68)	(0.59)	<.0001
B+ / B / B-	42.1%	44.6%	42.9%	38.0%		42.1%	42.5%		41.5%	43.0%	
	(0.55)	(1.36)	(1.44)	(2.33)	--	(0.64)	(0.69)	--	(0.70)	(0.62)	--
C+ / C / C-	20.1%	32.6%	28.8%	18.0%		26.3%	18.8%		20.1%	24.8%	
	(0.45)	(1.18)	(1.27)	(1.77)	--	(0.60)	(0.53)	--	(0.56)	(0.56)	--
D / less than D average	5.7%	6.4%	8.1%	3.7%		7.7%	4.2%		5.4%	6.5%	
	(0.25)	(0.61)	(0.71)	(0.81)	--	(0.35)	(0.26)	--	(0.32)	(0.31)	--
Exposed to Prevention Messages in School	78.6%	73.5%	74.6%	78.7%		74.3%	80.7%		81.5%	73.8%	
	(0.43)	(1.13)	(1.11)	(1.85)	.0067	(0.54)	(0.52)	<.0001	(0.55)	(0.52)	<.0001

Note: Care should be taken in interpreting statistically significant differences in this table. With large sample sizes, very small differences between groups can reach statistical significance.

[1] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).

[2] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[3] *p* value derived from F-tests for continuous variables and chi-square tests (df = 3) for dichotomous variables.

[4] *p* values derived from t-tests for continuous variables and chi-square tests (df = 1) for dichotomous variables.

[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Chapter 3. Associations Between Risk and Protective Factors and Past Year Marijuana Use

3.1   Introduction

This chapter presents the associations between the reported levels of risk and protective factors and past year marijuana use among youths in the 1999 National Household Survey on Drug Abuse (NHSDA). This chapter addresses the following issues:

- associations between the individual risk and protective factors and past year marijuana use among all youths aged 12 to 17;

- associations between the individual risk and protective factors and past year marijuana use for different demographic groups among youths; and

- associations between the individual risk and protective factors and past year marijuana use after statistically controlling for a set of demographic variables.

In general, higher levels of all risk factors were significantly associated with a higher likelihood of past year marijuana use, and higher levels of all protective factors (with the exception of parental communication about the dangers of substance use) were significantly associated with a lower likelihood of past year marijuana use.

These associations are first presented in bar charts showing the percentages of youths who reported past year marijuana use by categories of each risk or protective factor. The categories given are quartiles for factors derived from multiple items. The first quartile represents the lowest 25 percent of scores on the scale, and the fourth quartile represents the highest 25 percent of scores on the scale. The categories given for factors derived from single items are the response options on the relevant question. In some cases, the response options for single items have been combined for clarity of presentation.

For example, in this chapter's first figure, only 10.5 percent of youths who believed that adults in their community would strongly disapprove of marijuana use actually used marijuana in the past year, while 27.8 percent of youths who felt that adults would neither approve nor disapprove, or only somewhat disapprove, reported using it in the past year. In the language of probability, this indicates that the odds of not using marijuana in the past year for the strongly disapprove group were 89.5 / 10.5, or about 8.5 to 1. For the neither/somewhat disapprove group, the odds of not using marijuana in the past year were 72.2 / 27.8, or about 2.6 to 1. The ratio of these two odds (i.e., the "odds ratio" [OR]) comparing the strongly disapprove group to

the neither/somewhat disapprove group is (89.5 / 10.5) / (72.2 / 27.8), or about 3.3 to 1, indicating that youths who reported that adults in their community would strongly disapprove of occasional marijuana use were about 3 times more likely *not* to have used marijuana in the past year than other youths. Unless otherwise indicated, all statements indicating an association between a risk or protective factor and past year use of marijuana have been tested and are statistically significant at the .05 level.

Although the chapter provides evidence of statistical associations between risk and protective factors and past year marijuana use, the associations in cross-sectional data such as these do not carry with them the inference of causality (e.g., that the presence of a risk factor is the reason that youths use marijuana). Inferences of causality ideally require rigorous experiments in which a representative sample of youths are randomly assigned to either a "treatment group" (e.g., youths who are put in a situation that could decrease their use of marijuana use) or a "control group" (e.g., a comparison group of youths who are not put in such a situation). If these two groups are measured both before and after the "treatment," and if statistically significant differences in the behavior of interest are found between these groups, it can be inferred that the treatment was the reason for the difference. In prevention research, where the introduction of a risk factor to a random group of subjects is typically not permitted, causality related to risk factors is best determined through longitudinal designs in which a cohort or panel is followed over time (Bauman, 1980). This type of design enables the researchers to identify the temporality of the relationships between risk factors and behaviors, which is highly desirable for inferring which was the cause and which was the effect. Although the analyses in this report do not establish causality, it is likely that the cross-sectional associations of this chapter reflect a certain degree of bidirectional causality. For example, easy availability of marijuana may have led to marijuana use, or marijuana use may have led to easy availability of the substance, or both. Therefore, even though tests of these associations typically indicate statistically significant relations between risk and protective factors and past year marijuana use, they do not show that the propensity to use marijuana is a *direct* result of the presence of risk and protective factors.

Table 3.1 presents the prevalence rates among youths aged 12 to 17 for past year use of marijuana for the Nation as a whole and for selected demographic categories. For comparison purposes, Table 3.1 also includes rates of past year cigarette use and alcohol use among youths. Significance tests of the simple associations between marijuana use and risk and protective factors are presented in tables utilizing ORs as described above. ORs provide a convenient way to describe how varying levels of risk and protective factors are associated with the increased (or decreased) probability of a behavior that is measured using a "yes" or "no" indicator. The first set of ORs that is presented does not adjust for differences in demographic characteristics, such as age, race/ethnicity, and gender, that are typically associated with marijuana use (Tables 3.2 to 3.5). ORs are then presented for demographic characteristics (Table 3.6). Subsequently, ORs are

presented separately for different racial/ethnic groups (whites, blacks, Hispanics, and "others"), as well as by gender (Tables 3.7 to 3.10). Finally, ORs are presented after statistically adjusting for a set of demographic variables (Tables 3.11 to 3.14).

3.2   Prevalence of Past Year Marijuana Use

As a context for the discussion of the association between risk and protective factors and marijuana use, in 1999 approximately 14.2 percent of youths reported using marijuana in the past year (Table 3.1).

3.3   Community Domain

3.3.1   Community Domain Risk Factors

Figure 3.1 shows the percentages of youths who reported using marijuana in the past year by risk factor categories within the community domain. Youths with scores in the highest

Figure 3.1 Percentages of Youths Aged 12 to 17 Reporting Past Year Marijuana Use, by Community Domain Risk Factors: 1999
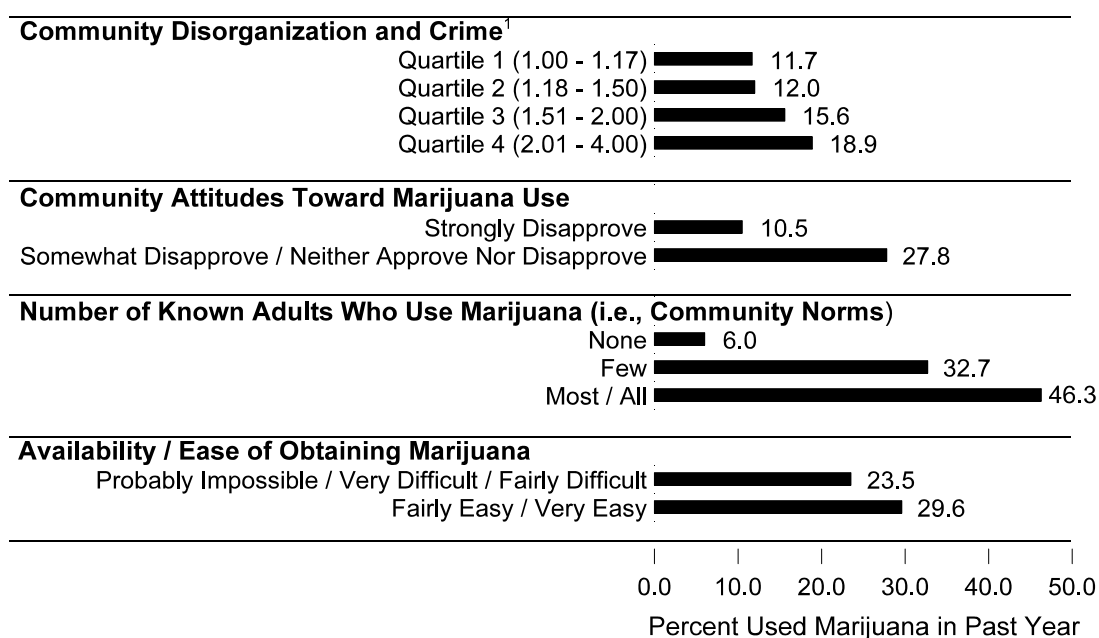
Note: The questions used to measure each of the factors are provided in Appendix A (Table A.1). The coding and distribution of the responses for each factor are provided in Table 2.1.

[1] Higher responses for risk factors generally indicate a higher risk of substance use. Quartile 4 consists of the highest 25 percent of youth scores, ranging between 2.01 and 4.00, which represent the highest level of community disorganization and crime.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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quartile of the community disorganization and crime scale (reported the most disorganization and crime) were more likely to have used marijuana in the past year (18.9 percent) compared with youths in the lowest quartile (11.7 percent). Youths who reported that adults in their neighborhood would somewhat disapprove or neither approve nor disapprove if they were to try marijuana once or twice were more likely to have used marijuana in the past year (27.8 percent) compared with youths who responded that adults in their neighborhood would strongly disapprove (10.5 percent). Youths who reported that most or all of the adults they personally knew used marijuana were more likely to have used marijuana in the past year (46.3 percent) compared with youths who knew few adult marijuana users (32.7 percent) or no adult marijuana users (6.0 percent). Finally, youths who reported that marijuana would be fairly easy or very easy to obtain were more likely to have used marijuana in the past year (29.6 percent) compared with youths who reported that marijuana would be difficult or impossible to obtain (23.5 percent).

3.3.2   Community Domain Protective Factors

Figure 3.2 shows the percentages of youths who reported using marijuana in the past year by protective factor categories within the community domain. Youths with scores in the fourth quartile of the neighborhood cohesion scale (reported the most neighborhood cohesion) were

Figure 3.2   Percentages of Youths Aged 12 to 17 Reporting Past Year Marijuana Use, by Community Domain Protective Factors: 1999

Note: The questions used to measure each of the factors are provided in Appendix A (Table A.1). The coding and distribution of the responses for each factor are provided in Table 2.1.

[1] Higher responses for protective factors generally indicate a higher level of protection and reduced risk of substance use. Quartile 4 consists of the highest 25 percent of youth scores, ranging between 3.51 and 4.00, which represent the highest level of neighborhood cohesion.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

less likely to have used marijuana in the past year (11.8 percent) compared with youths in the first quartile (16.9 percent). Youths who had been exposed to prevention messages in the media were less likely to have used marijuana in the past year (13.3 percent) compared with youths who had not been exposed to these types of messages (17.9 percent).

3.4   Family Domain

3.4.1   Family Domain Risk Factors

Figure 3.3 shows the percentages of youths who reported using marijuana in the past year by risk factor categories within the family domain. Youths with scores in the fourth quartile for parental monitoring (reported the least parental monitoring) were more likely to have used marijuana in the past year (28.4 percent) compared with youths who reported more parental monitoring. Youths were also more likely to have used marijuana in the past year if they believed their parents would only somewhat disapprove or neither approve nor disapprove if they used marijuana (41.7 percent) compared with youths who believed their parents would strongly disapprove of their marijuana use (11.3 percent).

Figure 3.3   Percentages of Youths Aged 12 to 17 Reporting Past Year Marijuana Use, by Family Domain Risk Factors: 1999
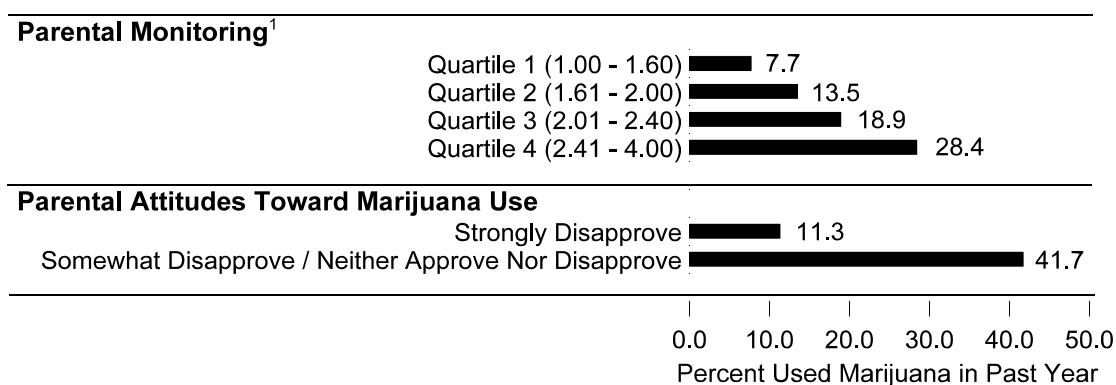
Parental Monitoring[1]

Quartile 1 (1.00 – 1.60)	7.7
Quartile 2 (1.61 – 2.00)	13.5
Quartile 3 (2.01 – 2.40)	18.9
Quartile 4 (2.41 – 4.00)	28.4

Parental Attitudes Toward Marijuana Use

Strongly Disapprove	11.3
Somewhat Disapprove / Neither Approve Nor Disapprove	41.7

0.0   10.0   20.0   30.0   40.0   50.0

Percent Used Marijuana in Past Year

Note: The questions used to measure each of the factors are provided in Appendix A (Table A.2). The coding and distribution of the responses for each factor are provided in Table 2.2.

[1] Higher responses for risk factors generally indicate a higher risk of substance use. Quartile 4 consists of the highest 25 percent of youth scores, ranging between 2.41 and 4.00, which represent the lowest level of parental monitoring.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

3.4.2 Family Domain Protective Factors

Figure 3.4 shows the percentages of youths who reported using marijuana in the past year by protective factor categories within the family domain. Youths with scores in the highest quartiles on the parental encouragement scale (reported the most encouragement) were less likely to have used marijuana in the past year (9.6 percent) compared with youths with scores in the lowest quartile (19.7 percent). Youths who selected one of their parents as the person they would talk with if they had a serious problem were less likely to have smoked marijuana in the past year (10.6 percent) compared with youths who selected someone other than their parents (22.9 percent). The association between parental communication about substance use and past year marijuana use was not statistically significant. The failure to find a significant relationship here is somewhat counterintuitive in that one would expect that the initiation by parents of a discussion of the dangers of substance use with their child would lead to a lower probability of that youth using illicit substances. One explanation might be that the cross-sectional nature of the NHSDA captured a significant number of cases in which the parental discussion came *after* having evidence or a strong suspicion that the child had used or was using an illicit substance.

Figure 3.4 Percentages of Youths Aged 12 to 17 Reporting Past Year Marijuana Use, by Family Domain Protective Factors: 1999
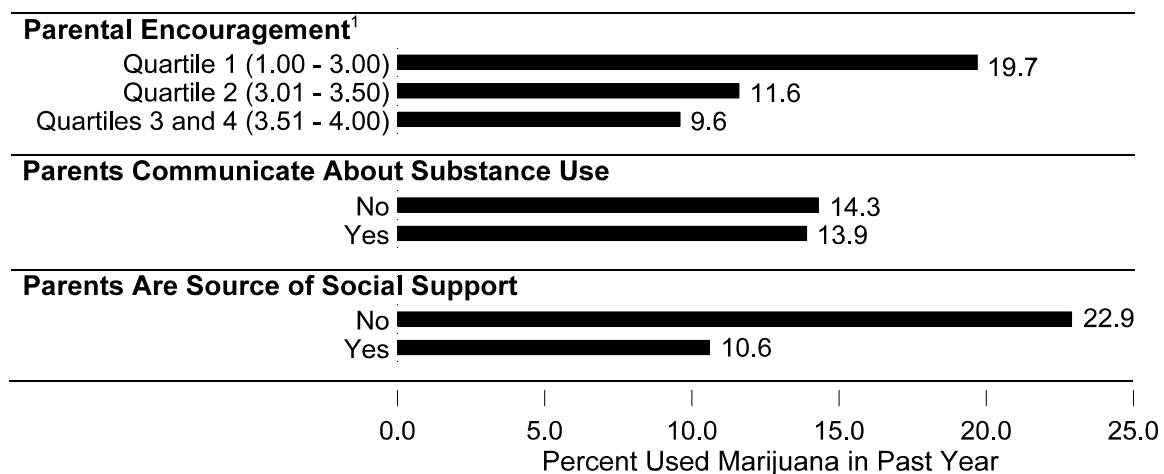
Note: The questions used to measure each of the factors are provided in Appendix A (Table A.2). The coding and distribution of the responses for each factor are provided in Table 2.2.

[1] Higher responses for protective factors generally indicate a higher level of protection and reduced risk of substance use. Quartiles 3 and 4 consist of the highest 50 percent of youth scores, ranging between 3.51 and 4.00, which represent the highest level of parental encouragement.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

3.5   Peer/Individual Domain

3.5.1   Peer/Individual Domain Risk Factors

Figure 3.5 shows the percentages of youths who reported using marijuana in the past year by risk factor categories within the peer/individual domain. For each of these factors, youths

Figure 3.5   Percentages of Youths Aged 12 to 17 Reporting Past Year Marijuana Use, by Peer/Individual Domain Risk Factors: 1999

	Percent Used Marijuana in Past Year
Antisocial Behavior[1]	
Quartiles 1 and 2 (1.00)	7.8
Quartile 3 (1.01 - 1.17)	16.2
Quartile 4 (1.18 - 5.00)	35.2
Individual Attitudes Toward Marijuana Use	
Strongly Disapprove	3.6
Somewhat Disapprove / Neither Approve Nor Disapprove	32.2
Friends' Attitudes Toward Marijuana Use	
Strongly Disapprove	3.5
Somewhat Disapprove / Neither Approve Nor Disapprove	32.4
Friends' Marijuana Use	
None	2.1
Few	20.0
Most / All	59.4
Perceived Risk of Marijuana Use[1]	
Quartile 1 (1.00 - 1.20)	4.0
Quartile 2 (1.21 - 1.60)	5.8
Quartile 3 (1.61 - 2.00)	14.3
Quartile 4 (2.01 - 4.00)	32.7
Risk-Taking Proclivity[1]	
Quartile 1 (1.00 - 1.33)	4.0
Quartile 2 (1.34 - 2.00)	11.7
Quartile 3 (2.01 - 2.33)	17.3
Quartile 4 (2.34 - 4.00)	30.1

0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0

Percent Used Marijuana in Past Year
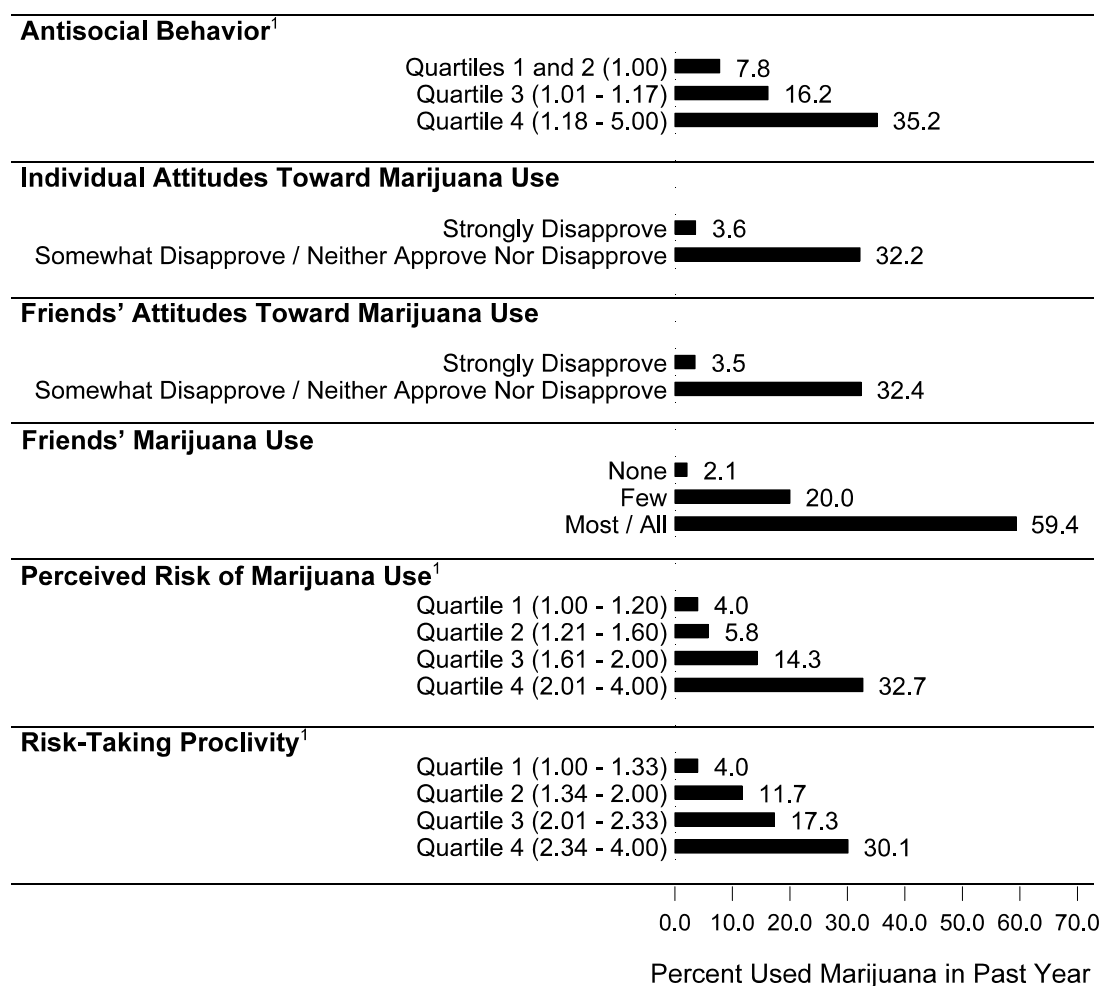
Note: The questions used to measure each of the factors are provided in Appendix A (Table A.3). The coding and distribution of the responses for each factor are provided in Table 2.3.

[1] Higher responses for risk factors generally indicate a higher risk of substance use. Quartile 4 consists of the highest 25 percent of youth scores for a given factor, which represents the highest level of risk. For example, Quartile 4 for antisocial behavior consists of the highest 25 percent of youth scores, ranging between 1.18 and 5.00, and represents the highest level of antisocial behavior.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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with higher levels of the factor were more likely to have used marijuana in the past year compared with youths with lower levels of the factor. The associations with past year marijuana use were strongest for individual positive attitudes toward marijuana use, friends' positive attitudes toward marijuana use, and friends' use of marijuana. Youths who reported that they would somewhat disapprove or neither approve nor disapprove of marijuana use by someone their age were more likely to have used marijuana in the past year (32.2 percent) compared with youths who reported that they would strongly disapprove of youth marijuana use (3.6 percent). Similarly, youths who reported that their friends would somewhat disapprove or neither approve nor disapprove of the youth using marijuana were more likely to have used marijuana in the past year (32.4 percent) compared with youths that reported that their friends would strongly disapprove of the youth using marijuana (3.5 percent). Finally, youths who reported that most or all of their friends used marijuana were more likely to have used marijuana in the past year (59.4 percent) compared with youths who reported that few or none of their friends used marijuana (20.0 and 2.1 percent, respectively).

3.5.2 Peer/Individual Domain Protective Factors

Figure 3.6 shows the percentages of youths who reported using marijuana in the past year by protective factor categories within the peer/individual domain. Youths who had participated in two or more extracurricular activities in the past year were less likely to have used marijuana

Figure 3.6 Percentages of Youths Aged 12 to 17 Reporting Past Year Marijuana Use, by Peer/Individual Domain Protective Factors: 1999

Note: The questions used to measure each of the factors are provided in Appendix A (Table A.3). The coding and distribution of the responses for each factor are provided in Table 2.3.

[1] Higher responses for protective factors generally indicate a higher level of protection and reduced risk of substance use. Quartile 4 consists of the highest 25 percent of youth scores, ranging between 3.26 and 4.00, which represent the highest level of religiosity.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

in the past year (11.5 percent) compared with youths who had not (20.0 percent). Youths in the lowest quartile of the religiosity scale (reported the lowest level of religiosity) were more than 4 times more likely to have used marijuana in the past year (23.3 percent) compared with youths in the highest quartile (5.0 percent).

3.6   School Domain

3.6.1   School Domain Risk Factors

Figure 3.7 shows the percentages of youths who reported using marijuana in the past year by risk factor categories within the school domain.[16] Youths who reported that most or all of the students in their grade at school used marijuana were more likely to be past year marijuana users (41.4 percent) compared with youths who reported that few or none of the students in their grade

Figure 3.7   Percentages of Youths Aged 12 to 17 Reporting Past Year Marijuana Use, by School Domain Risk Factors: 1999
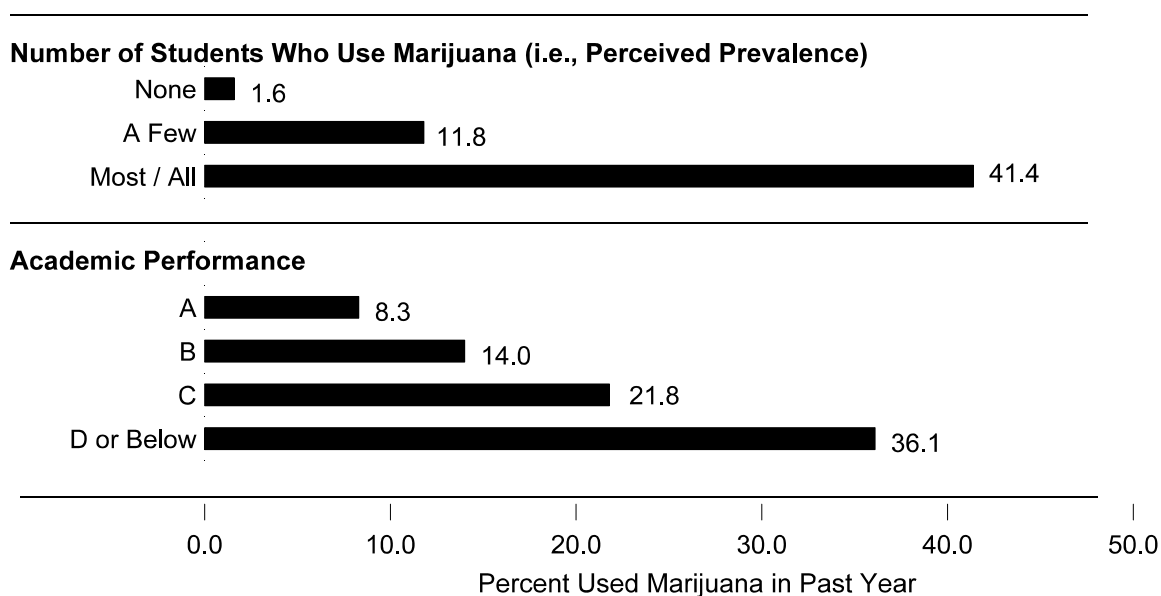
Note: The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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[16] Approximately 25 percent of youths aged 12 to 17 did not answer the questions covering the school domain risk and protective factors and thus are not included in these analyses. Analyses in which revised sample weights were computed for the subsample who did complete these questions indicated that these missing cases did not have a significant effect on these measures. See Appendix B for a fuller discussion of these missing values for the school domain questions.

at school used marijuana (11.8 and 1.6 percent, respectively). Youths were also more likely to have used marijuana in the past year if they reported poor academic performance in their last completed semester.

3.6.2   School Domain Protective Factors

Figure 3.8 shows the percentages of youths who reported using marijuana in the past year by protective factor categories within the school domain. Youths with scores in the highest quartile of the commitment to school scale were less likely to have used marijuana in the past year (9.1 percent) compared with youths in the lowest quartile (24.0 percent). Youths who reported that a student in their grade at school would be in a lot of trouble if they used marijuana were less likely to have used marijuana in the past year (14.3 percent) compared with those who reported that a student would be in no trouble at all or a little trouble (22.6 percent). Finally, youths who had been exposed to substance abuse prevention messages during school were less likely to have used marijuana in the past year (13.9 percent) compared with those who had not (20.4 percent).

Figure 3.8 Percentages of Youths Aged 12 to 17 Reporting Past Year Marijuana Use, by School Domain Protective Factors: 1999
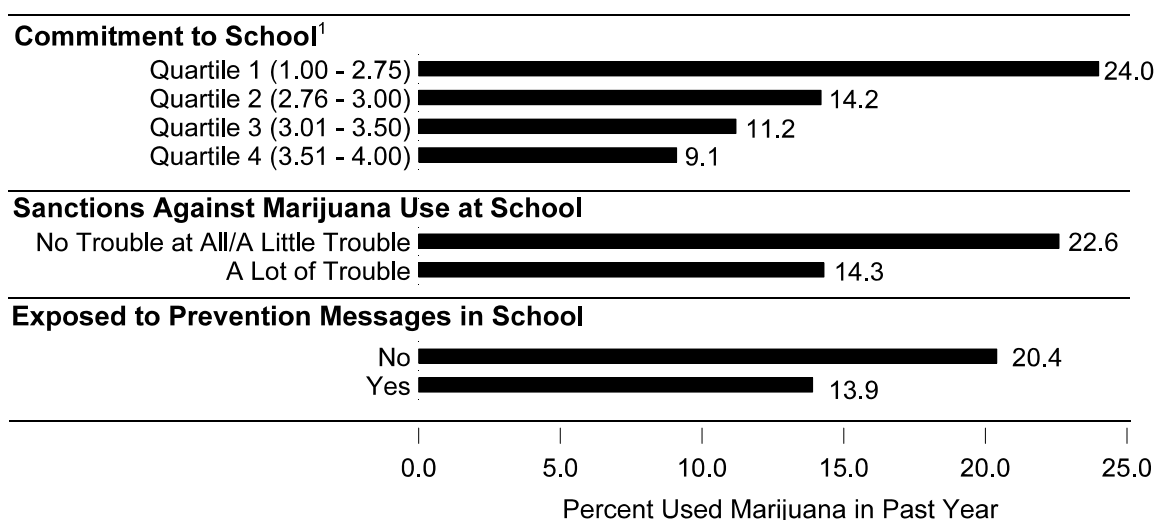
Note: The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.

[1] Higher responses for protective factors generally indicate a higher level of protection and reduced risk of substance use. Quartile 4 consists of the highest 25 percent of youth scores, ranging between 3.51 and 4.00, which represent the highest level of commitment to school.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

3.7   Significance Tests for Associations with Past Year Marijuana Use

The discussion to this point has focused on the associations between the risk and protective factors and past year marijuana use, as represented in the figures. The tests of those associations are presented by domain in Tables 3.2 through 3.5, with the associations represented as odds ratios (ORs) as described earlier. ORs greater than one indicate that a higher level of the factor is associated with a higher likelihood of past year marijuana use, whereas ORs less than one indicate that a higher level of the factor is associated with a lower likelihood of past year marijuana use.

All of the risk and protective factors were significantly associated with past year marijuana use, with the exception of parental communication about the dangers of substance use. The risk factors in all domains had ORs greater than one, indicating that higher levels of these risk factors were associated with a higher likelihood of past year marijuana use. The protective factors in all domains had ORs less than one, indicating that higher levels of these factors were associated with a lower likelihood of past year marijuana use.

3.8   Demographic Variables

Table 3.6 shows the odds of past year marijuana use by age, gender, race/ethnicity, number of parents in the home, household income, county type, and geographic region. Most of these variables displayed significant differences between one or more levels in the odds of past year marijuana use, which confirms the differences that were apparent in Table 3.1.

Youths aged 15 to 17 had a higher odds of past year use of marijuana than youths aged 12 to 14. Males showed a slightly higher odds of past year use than females. Blacks were less likely than whites to have used marijuana in the past year. Youths in two-parent families had lower odds of past year marijuana use than other youths. Youths in large and small metropolitan statistical areas (MSAs) had somewhat higher odds of marijuana use in the past year than youths from non-MSAs. Youths in the West region had higher odds of having used marijuana in the past year than youths in the other regions.

3.9   Associations of Factors with Marijuana Use, by Race/Ethnicity and Gender

Having examined and confirmed the associations between risk and protective factors and marijuana use, one might ask if these associations would be the same among various demographic subgroups. Tables 3.7 through 3.10 provide the ORs for different race/ethnicity and gender categories with each risk and protective factor domain presented in a separate table.

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Statistically significant associations were found between most, but not all, factors and past year use of marijuana for each racial/ethnic group and gender. The strength of the relationships, however, was not necessarily the same in all groups.

Within the community domain, higher levels of neighborhood cohesiveness were significantly associated with lower odds of past year marijuana use for whites (OR = 0.72) and blacks (OR = 0.81), but not for Hispanics or youths in the "other" category (Table 3.7). Exposure to prevention messages in the media was significantly associated with lower odds of past year marijuana use for whites (OR = 0.68) and Hispanics (OR = 0.63), but not for blacks or youths in the "other" category.

Within the family domain, higher levels of parental communication about substances were significantly associated with lower odds of past year marijuana use among Hispanic youths (OR = 0.67), but not among youths of other racial/ethnic groups (Table 3.8). Within the peer/individual domain, participation in two or more extracurricular activities was significantly associated with lower odds of past year marijuana use among whites (OR = 0.45), blacks (OR = 0.64), and Hispanics (OR = 0.70), but not for youths in the "other" category (Table 3.9). Within the school domain, strong sanctions against illegal drug use were significantly associated with lower odds of past year marijuana use among whites (OR = 0.48), Hispanics (OR = 0.61), and youths in the "other" category (OR = 0.31), but not for blacks (Table 3.10). Finally, exposure to prevention messages in school was associated with lower odds of past year marijuana use for whites (OR = 0.60) and Hispanics (OR = 0.55), but not for blacks or youths in the "other" category.

The associations between the risk and protective factors and past year marijuana use were consistent between males and females for all factors. Significant associations were found for both males and females on all factors, with the exception of parental communication with youths about the dangers of substance use, which was not significant for either gender.

3.10   Associations of Factors with Marijuana Use, Adjusting for Demographic Variables

Given the significant differences discussed above between demographic groups in past year marijuana use and risk and protective factors, one could ask whether the associations between risk and protective factors and past year marijuana use presented in Tables 3.2 through 3.5 and 3.7 through 3.10 would still be found after adjusting for all of these demographic characteristics simultaneously. The ORs between each risk and protective factor and past year marijuana use after adjusting for demographic differences are presented in Tables 3.11 to 3.14, with each domain of factors presented in a separate table.

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The tables show that, with the exception of parental communication with youths about the dangers of substance abuse, the ORs between the risk and protective factors and past year marijuana use were still significant after adjusting for the demographic differences. Therefore, risk and protective factors display the expected association with marijuana use, irrespective of gender, race/ethnicity, household income, number of parents in the household, county type, or geographic region.

Table 3.1 Sample Size, Estimated Population Size, and Percentages Reporting Past Year Marijuana Use, Cigarette Use, and Alcohol Use among Youths Aged 12 to 17, by Demographics: 1999

Demographic Characteristic	Sample Size[1]	Estimated Population Size[2]	Marijuana Use Percent	Marijuana Use Standard Error	Cigarette Use Percent	Cigarette Use Standard Error	Alcohol Use Percent	Alcohol Use Standard Error
Overall	25,357	23,203,000	14.2	0.29	23.4	0.37	34.1	0.41
Age in Years								
12	3,967	3,570,000	1.5	0.24	5.1	0.43	7.4	0.52
13	4,385	4,017,000	4.7	0.41	13.4	0.61	17.8	0.73
14	4,416	4,068,000	10.1	0.55	20.5	0.75	30.0	0.93
15	4,192	3,797,000	17.1	0.73	27.6	0.86	41.2	0.98
16	4,333	4,032,000	24.1	0.80	33.6	0.91	49.9	0.94
17	4,064	3,719,000	27.1	0.87	39.5	0.97	57.8	0.93
Gender								
Male	12,798	11,877,000	14.9	0.41	23.4	0.50	33.6	0.54
Female	12,559	11,326,000	13.3	0.39	23.4	0.51	34.7	0.58
Race/Ethnicity								
White (non-Hispanic)	17,125	15,485,000	14.6	0.34	26.0	0.45	36.7	0.47
Black (non-Hispanic)	3,384	3,306,000	12.1	0.78	15.8	0.85	23.7	1.01
Hispanic	3,516	3,219,000	14.9	0.83	20.6	0.93	35.2	1.10
Other[3]	1,332	1,193,000	11.6	1.47	18.3	1.58	27.2	2.08
Number of Parents in Home								
Two	17,620	16,407,000	12.0	0.32	21.2	0.43	32.5	0.48
Less than two	7,737	6,796,000	19.4	0.59	28.8	0.66	38.2	0.73
Household Income								
≥$20,000	20,457	18,832,000	14.2	0.32	23.5	0.41	34.8	0.45
<$20,000	4,900	4,371,000	14.2	0.67	23.1	0.80	31.3	0.93
County Type[4]								
Large metro	10,116	11,558,000	14.4	0.44	21.0	0.54	33.2	0.65
Small metro	8,316	6,992,000	14.7	0.52	25.1	0.67	34.6	0.72
Nonmetro	6,925	4,652,000	12.8	0.48	26.7	0.74	35.9	0.76
Geographic Region								
Northeast	4,475	4,154,000	14.0	0.75	22.9	0.96	36.1	1.16
Midwest	6,530	5,471,000	14.3	0.56	26.0	0.77	35.5	0.73
South	7,731	8,245,000	12.9	0.46	24.3	0.63	32.0	0.67
West	6,621	5,333,000	16.0	0.60	19.8	0.61	34.5	0.88

[1] The number of youths aged 12 to 17 who completed the 1999 NHSDA.

[2] The estimated number of youths aged 12 to 17 in the United States.

[3] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[4] Large metro = metropolitan statistical areas (MSAs) with population of 1 million or more; small metro = MSAs with population of 50K to < 1 million; nonmetro = not part of an MSA.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.2   Odds Ratios and Confidence Intervals (95 Percent) of *Community Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

Community Domain[1]	Risk/Protective Factor	Unadjusted OR[2]	*p* value	95% CI
		Odds of Past Year Marijuana Use		
Community Disorganization and Crime	Risk	1.43	<.0001	(1.33, 1.54)
Neighborhood Cohesiveness	Protective	0.79	<.0001	(0.74, 0.84)
Community Attitudes Toward Substance Use	Risk			
Multiple substance scale[3]		2.23	<.0001	(2.10, 2.38)
Marijuana (try once or twice)		1.95	<.0001	(1.84, 2.07)
Community Norms Toward Substance Use	Risk			
Multiple substance scale[3]		5.09	<.0001	(4.62, 5.61)
Marijuana (try once or twice)		4.14	<.0001	(3.78, 4.53)
Availability of Marijuana	Risk	2.72	<.0001	(2.55, 2.90)
Exposed to Prevention Messages in Media	Protective	0.70	<.0001	(0.63, 0.79)

CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.1). The coding and distribution of the responses for each factor are provided in Table 2.1.

[2] Odds ratios (ORs) are based on separate logistic regression models of past year marijuana use for each of the factors. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. ORs < 1.0 indicate that the odds of past year marijuana use decreased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use. An OR of 1.43 for the community disorganization and crime risk factor indicates that the odds of past year marijuana use increased 1.43 times with each unit increase in the community disorganization and crime scale.

[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.3   Odds Ratios and Confidence Intervals (95 Percent) of *Family Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

| Family Domain[1] | Risk/Protective Factor | Odds of Past Year Marijuana Use | | |
		Unadjusted OR[2]	*p* value	95% CI
Parental Monitoring	Risk	2.60	<.0001	(2.40, 2.82)
Parental Encouragement	Protective	0.59	<.0001	(0.56, 0.62)
Parental Attitudes Toward Substance Use	Risk			
Multiple substance scale[3]		2.84	<.0001	(2.59, 3.12)
Marijuana (try once or twice)		2.47	<.0001	(2.28, 2.67)
Parents Communicate About Substance Use	Protective	0.97	.4747	(0.88, 1.06)
Parents Are Source of Social Support	Protective	0.40	<.0001	(0.37, 0.44)

CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.2). The coding and distribution of the responses for each factor are provided in Table 2.2.

[2] Odds ratios (ORs) are based on separate logistic regression models of past year marijuana use for each of the factors. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. ORs < 1.0 indicate that the odds of past year marijuana use decreased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use. An OR of 2.60 for the parental monitoring risk factor indicates that the odds of past year marijuana use increased 2.60 times with each unit increase in the parental monitoring scale (note that high scores on the parental monitoring scale indicate low levels of monitoring).

[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.4 Odds Ratios and Confidence Intervals (95 Percent) of *Peer/Individual Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

| Peer/Individual Domain[1] | Risk/Protective Factor | Odds of Past Year Marijuana Use | | |
		Unadjusted OR[2]	*p* value	95% CI
Antisocial Behavior	Risk	7.10	<.0001	(6.02, 8.38)
Individual Attitudes Toward Substance Use	Risk			
Multiple substance use				
Marijuana (try once or twice)		4.47	<.0001	(4.19, 4.75)
Friends' Attitudes Toward Substance Use	Risk			
Multiple substance scale[3]		4.19	<.0001	(3.94, 4.47)
Marijuana (try once or twice)		4.37	<.0001	(4.12, 4.64)
Friends' Substance Use	Risk			
Multiple substance scale[3]		8.05	<.0001	(7.41, 8.74)
Marijuana		6.25	<.0001	(5.80, 6.74)
Perceived Risk of Substance Use	Risk			
Multiple substance scale[3]		3.76	<.0001	(3.49, 4.05)
Marijuana		3.48	<.0001	(3.29, 3.68)
Risk-Taking Proclivity	Risk	3.27	<.0001	(3.05, 3.50)
Participated in Two or More Extracurricular Activities	Protective	0.52	<.0001	(0.47, 0.57)
Religiosity	Protective	0.47	<.0001	(0.44, 0.50)

CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.3). The coding and distribution of the responses for each factor are provided in Table 2.3.
[2] Odds ratios (ORs) are based on separate logistic regression models of past year marijuana use for each of the factors. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. ORs < 1.0 indicate that the odds of past year marijuana use decreased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use. An OR of 7.10 for the antisocial behavior risk factor indicates that the odds of past year marijuana use increased 7.10 times with each unit increase in the antisocial behavior scale.
[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.5 Odds Ratios and Confidence Intervals (95 Percent) of *School Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

School Domain[1]	Risk/Protective Factor	Unadjusted OR[2]	p value	95% CI
Commitment to School	Protective	0.45	<.0001	(0.42, 0.48)
Sanctions Against Substance Use at School	Protective			
Multiple substance scale[3]		0.28	<.0001	(0.25, 0.32)
Marijuana		0.52	<.0001	(0.45, 0.59)
Perceived Prevalence of Substance Use	Risk			
Multiple substance scale[3]		6.05	<.0001	(5.49, 6.68)
Marijuana		4.78	<.0001	(4.40, 5.19)
Academic Performance	Risk	1.81	<.0001	(1.70, 1.92)
Exposed to Prevention Messages in School	Protective	0.63	<.0001	(0.56, 0.70)

CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.

[2] Odds ratios (ORs) are based on separate logistic regression models of past year marijuana use for each of the factors. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. ORs < 1.0 indicate that the odds of past year marijuana use decreased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use. An OR of 4.78 for the perceived prevalence of marijuana risk factor indicates that the odds of past year marijuana use increased 4.78 times with each unit increase in the perceived prevalence of marijuana question.

[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.6 Odds Ratios and Confidence Intervals (95 Percent) of *Demographics* and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

Demographic Characteristic	Odds of Past Year Marijuana Use		
	Unadjusted OR[1]	*p* value	95% CI
Age (Continuous - 12 to 17)	1.67	<.0001	(1.63, 1.72)
Gender (Male vs. Female)	1.14	.0047	(1.04, 1.25)
Race/Ethnicity			
Black vs. white	0.81	.0064	(0.69, 0.94)
Hispanic vs. white	1.02	.7473	(0.89, 1.18)
Other[2] vs. white	0.77	.0731	(0.57, 1.03)
Number of Parents in Home (2 vs. Others)	0.57	<.0001	(0.52, 0.62)
Economic Deprivation (Household Income <$20,000)	1.00	1.0000	(0.89, 1.13)
County Type			
Large MSA vs. non-MSA	1.15	.0166	(1.03, 1.28)
Small MSA vs. non-MSA	1.18	.0059	(1.05, 1.33)
Geographic Region			
Northeast vs. West	0.85	.0375	(0.73, 0.99)
Midwest vs. West	0.87	.0299	(0.77, 0.99)
South vs. West	0.78	<.0001	(0.69, 0.88)

CI = confidence interval; MSA = metropolitan statistical area.

[1] Odds ratios (ORs) are based on separate logistic regression models of past year marijuana use for each of the demographic variables. ORs have not been adjusted for other demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. ORs < 1.0 indicate that the odds of past year marijuana use decreased with each unit increase in the predictor. An OR of 1.67 for age indicates that the odds of past year marijuana use increased 1.67 times with each unit increase in age.

[2] "Other" includes those other than whites, blacks, Hispanics (i.e., Asians, American Indians or Alaska Natives, or Pacific Islanders).

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.7 Unadjusted Odds Ratios and Confidence Intervals (95 Percent) of *Community Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17, by Race/Ethnicity and Gender: 1999

	Race/Ethnicity								Gender			
	Whites		Blacks		Hispanics		Other[1]		Males		Females	
Community Domain[2]	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value
Community Disorganization and Crime	1.54 (1.40, 1.69)	<.0001	1.28 (1.08, 1.53)	.0055	1.43 (1.20, 1.69)	.0001	2.82 (1.94, 4.10)	<.0001	1.48 (1.35, 1.63)	<.0001	1.36 (1.23, 1.51)	<.0001
Neighborhood Cohesiveness	0.72 (0.67, 0.77)	<.0001	0.81 (0.69, 0.95)	.0095	1.00 (0.85, 1.18)	.9888	0.88 (0.65, 1.20)	.4226	0.79 (0.73, 0.86)	<.0001	0.79 (0.72, 0.85)	<.0001
Community Attitudes Toward Substance Use												
Multiple substance scale[4]	2.65 (2.45, 2.88)	<.0001	1.67 (1.42, 1.98)	<.0001	1.72 (1.48, 2.01)	<.0001	2.55 (1.84, 3.52)	<.0001	2.43 (2.22, 2.65)	<.0001	2.03 (1.86, 2.22)	<.0001
Marijuana (trying once or twice)	2.31 (2.14, 2.49)	<.0001	1.57 (1.35, 1.83)	<.0001	1.49 (1.30, 1.70)	<.0001	2.11 (1.53, 2.91)	<.0001	2.12 (1.96, 2.30)	<.0001	1.76 (1.62, 1.92)	<.0001
Community Norms Toward Substance Use												
Multiple substance scale[4]	6.29 (5.58, 7.11)	<.0001	3.22 (2.61, 3.97)	<.0001	4.02 (3.12, 5.19)	<.0001	7.38 (4.37, 12.47)	<.0001	5.13 (4.49, 5.88)	<.0001	5.07 (4.37, 5.89)	<.0001
Marijuana (trying once or twice)	5.60 (4.97, 6.30)	<.0001	2.57 (2.19, 3.01)	<.0001	3.28 (2.64, 4.07)	<.0001	4.36 (2.34, 8.15)	<.0001	4.15 (3.67, 4.70)	<.0001	4.13 (3.61, 4.73)	<.0001
Availability of Marijuana	3.20 (2.95, 3.48)	<.0001	2.12 (1.84, 2.44)	<.0001	2.04 (1.75, 2.38)	<.0001	2.62 (2.01, 3.42)	<.0001	2.45 (2.26, 2.67)	<.0001	3.15 (2.86, 3.47)	<.0001
Exposed to Prevention Messages (Yes vs. No)	0.68 (0.59, 0.78)	<.0001	0.86 (0.62, 1.19)	.3738	0.63 (0.48, 0.83)	.0010	0.72 (0.40, 1.33)	.2966	0.64 (0.55, 0.74)	<.0001	0.82 (0.69, 0.97)	.0208

OR = odds ratio; CI = confidence interval.

[1] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[2] The questions used to measure each of the factors are provided in Appendix A (Table A.1). The coding and distribution of the responses for each factor are provided in Table 2.1.

[3] ORs are based on separate logistic regression models of past year marijuana use for each of the factors, run separately for each of the categories of race/ethnicity and gender. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[4] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.8 Unadjusted Odds Ratios and Confidence Intervals (95 Percent) of *Family Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17, by Race/Ethnicity and Gender: 1999

	Race/Ethnicity								Gender			
	Whites		Blacks		Hispanics		Other[1]		Males		Females	
Family Domain[2]	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value
Parental Monitoring	2.72 (2.48, 2.99)	<.0001	2.25 (1.82, 2.79)	<.0001	2.46 (1.95, 3.12)	<.0001	2.09 (1.35, 3.24)	.0010	2.49 (2.21, 2.80)	<.0001	2.73 (2.44, 3.05)	<.0001
Parental Encouragement	0.56 (0.53, 0.60)	<.0001	0.67 (0.58, 0.78)	<.0001	0.61 (0.53, 0.71)	<.0001	0.55 (0.41, 0.72)	<.0001	0.60 (0.56, 0.65)	<.0001	0.58 (0.54, 0.62)	<.0001
Parental Attitudes Toward Substance Use												
Multiple substance scale[4]	4.35 (3.80, 4.99)	<.0001	1.48 (1.22, 1.80)	.0001	2.06 (1.68, 2.52)	<.0001	1.89 (1.32, 2.71)	.0006	2.80 (2.49, 3.15)	<.0001	2.88 (2.53, 3.27)	<.0001
Marijuana (try once or twice)	3.31 (2.99, 3.67)	<.0001	1.58 (1.31, 1.91)	<.0001	1.79 (1.48, 2.17)	<.0001	1.75 (1.27, 2.41)	<.0001	2.46 (2.22, 2.74)	<.0001	2.46 (2.19, 2.77)	<.0001
Parents Communicate About Substance Use	1.02 (0.91, 1.14)	.7016	1.01 (0.77, 1.33)	.9480	0.67 (0.53, 0.84)	.0006	0.83 (0.51, 1.35)	.4484	1.00 (0.89, 1.13)	.9528	0.94 (0.82, 1.07)	.3460
Parents Are Source of Social Support	0.37 (0.33, 0.41)	<.0001	0.53 0.40, 0.71)	<.0001	0.50 (0.39, 0.65)	<.0001	0.31 (0.20, 0.48)	<.0001	0.41 (0.36, 0.46)	<.0001	0.39 (0.34, 0.45)	<.0001

OR = odds ratio; CI = confidence interval.

[1] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[2] The questions used to measure each of the factors are provided in Appendix A (Table A.2). The coding and distribution of the responses for each factor are provided in Table 2.2.

[3] ORs are based on separate logistic regression models of past year marijuana use for each of the factors, run separately for each of the categories of race/ethnicity and gender. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[4] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.9 Unadjusted Odds Ratios and Confidence Intervals (95 Percent) of *Peer/Individual Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17, by Race/Ethnicity and Gender: 1999

| | Race/Ethnicity | | | | | | | | Gender | | | |
| | Whites | | Blacks | | Hispanics | | Other[1] | | Males | | Females | |
Peer/Individual Domain[2]	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value
Antisocial Behavior	7.56 (6.07, 9.42)	<.0001	5.11 (3.62, 7.22)	<.0001	6.72 (4.44, 10.19)	<.0001	24.24 (10.04, 58.55)	<.0001	5.82 (4.74, 7.14)	<.0001	12.73 (9.59, 16.90)	<.0001
Individual Attitudes Toward Substance Use												
Multiple substance scale[4]	4.67 (4.33, 5.03)	<.0001	3.04 (2.58, 3.59)	<.0001	3.59 (2.99, 4.31)	<.0001	4.36 (3.32, 5.73)	<.0001	3.76 (3.44, 4.12)	<.0001	4.82 (4.40, 5.29)	<.0001
Marijuana (try once or twice)	4.95 (4.59, 5.34)	<.0001	3.51 (3.01, 4.08)	<.0001	3.46 (2.93, 4.09)	<.0001	4.84 (3.62, 6.47)	<.0001	4.01 (3.68, 4.38)	<.0001	5.04 (4.60, 5.53)	<.0001
Friends' Attitudes Toward Substance Use												
Multiple substance scale[4]	4.76 (4.41, 5.14)	<.0001	2.67 (2.27, 3.13)	<.0001	3.54 (3.02, 4.16)	<.0001	4.89 (3.55, 6.73)	<.0001	3.71 (3.40, 4.05)	<.0001	4.95 (4.53, 5.42)	<.0001
Marijuana (try once or twice)	4.96 (4.61, 5.33)	<.0001	3.07 (2.63, 3.59)	<.0001	3.46 (3.02, 3.97)	<.0001	4.74 (3.48, 6.47)	<.0001	3.86 (3.55, 4.19)	<.0001	5.09 (4.67, 5.54)	<.0001
Friends' Substance Use												
Multiple substance scale[4]	8.98 (8.15, 9.90)	<.0001	5.64 (4.58, 6.94)	<.0001	6.26 (4.97, 7.90)	<.0001	12.17 (7.75, 19.11)	<.0001	7.62 (6.81, 8.54)	<.0001	8.69 (7.67, 9.84)	<.0001
Marijuana	7.14 (6.51, 7.82)	<.0001	4.93 (4.19, 5.80)	<.0001	4.81 (3.94, 5.87)	<.0001	6.97 (4.80, 10.11)	<.0001	5.85 (5.28, 6.47)	<.0001	6.77 (6.09, 7.52)	<.0001
Perceived Risk of Substance Use												
Multiple substance scale[4]	4.87 (4.44, 5.33)	<.0001	2.18 (1.85, 2.56)	<.0001	3.04 (2.55, 3.63)	<.0001	2.70 (1.99, 3.67)	<.0001	3.73 (1.99, 3.67)	<0.001	3.86 (3.49, 4.27)	<.0001
Marijuana	4.02 (3.74, 4.32)	<.0001	2.50 (2.15, 2.92)	<.0001	2.92 (2.56, 3.34)	<.0001	3.07 (2.33, 4.04)	<.0001	3.54 (3.27, 3.84)	<0.001	3.44 (3.17, 3.73)	<.0001
Risk-Taking Proclivity	3.45 (3.18, 3.75)	<.0001	2.45 (2.02, 2.97)	<.0001	3.23 (2.63, 3.97)	<.0001	4.09 (2.62, 6.39)	<.0001	2.97 (2.69, 3.27)	<.0001	3.84 (3.46, 4.26)	<.0001
Participation in Two or More Extracurricular Activities	0.45 (0.40, 0.50)	<.0001	0.64 (0.48, 0.86)	.0035	0.70 (0.55, 0.87)	.0017	0.66 (0.42, 1.05)	.0815	0.51 (0.45, 0.57)	<.0001	0.54 (0.47, 0.62)	<.0001
Religiosity	0.44 (0.41, 0.47)	<.0001	0.60 (0.50, 0.72)	<.0001	0.57 (0.48, 0.67)	<.0001	0.56 (0.39, 0.82)	.0031	0.48 (0.44, 0.52)	<.0001	0.47 (0.43, 0.52)	<.0001

ORs = odds ratio; CI = confidence interval.

[1] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[2] The questions used to measure each of the factors are provided in Appendix A (Table A.3). The coding and distribution of the responses for each factor are provided in Table 2.3.

[3] ORs are based on separate logistic regression models of past year marijuana use for each of the factors, run separately for each of the categories of race/ethnicity and gender. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[4] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.10 Unadjusted Odds Ratios and Confidence Intervals (95 Percent) of *School Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17, by Race/Ethnicity and Gender: 1999

School Domain[2]	Race/Ethnicity								Gender			
	Whites		Blacks		Hispanics		Other[1]		Males		Females	
	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value	OR[3] (95% CI)	*p* value
Commitment to School	0.43 (0.40, 0.47)	<.0001	0.58 (0.46, 0.74)	<.0001	0.43 (0.34, 0.54)	<.0001	0.32 (0.21, 0.51)	<.0001	0.53 (0.48, 0.58)	<.0001	0.37 (0.33, 0.41)	<.0001
Sanctions Against Substance Use at School												
Multiple substance scale[4]	0.26 (0.22, 0.30)	<.0001	0.39 (0.27, 0.56)	<.0001	0.37 (0.27, 0.51)	<.0001	0.14 (0.07, 0.28)	<.0001	0.28 (0.23, 0.34)	<.0001	0.29 (0.24, 0.34)	<.0001
Illegal drugs	0.48 (0.41, 0.57)	<.0001	0.70 (0.47, 1.03)	.0719	0.61 (0.43, 0.86)	.0052	0.31 (0.15, 0.65)	.0019	0.51 (0.42, 0.61)	<.0001	0.54 (0.43, 0.67)	<.0001
Perceived Prevalence of Substance Use												
Multiple substance scale[4]	6.58 (5.80, 7.45)	<.0001	4.51 (3.57, 5.71)	<.0001	5.39 (4.14, 7.02)	<.0001	7.12 (4.15, 12.23)	<.0001	6.35 (5.53, 7.29)	<.0001	6.18 (5.35, 7.14)	<.0001
Marijuana	5.31 (4.78, 5.90)	<.0001	3.59 (2.96, 4.34)	<.0001	4.83 (3.85, 6.07)	<.0001	4.73 (3.11, 7.19)	<.0001	4.71 (4.22, 5.25)	<.0001	5.01 (4.42, 5.66)	<.0001
Academic Performance	1.81 (1.69, 1.94)	<.0001	1.56 (1.29, 1.88)	<.0001	1.96 (1.65, 2.32)	<.0001	2.38 (1.69, 3.37)	<.0001	1.76 (1.61, 1.92)	<.0001	1.88 (1.73, 2.03)	<.0001
Exposure to Prevention Messages in School (Yes vs. No)	0.60 (0.53, 0.68)	<.0001	0.90 (0.64, 1.25)	.5197	0.55 (0.40, 0.74)	.0001	0.80 (0.44, 1.45)	.4588	0.62 (0.53, 0.71)	<.0001	0.66 (0.56, 0.78)	<.0001

OR = odds ratio; CI = confidence interval.

[1] "Other" includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, or Native Hawaiians or other Pacific Islanders).

[2] The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.

[3] ORs are based on separate logistic regression models of past year marijuana use for each of the factors, run separately for each of the categories of race/ethnicity and gender. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[4] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.11 Adjusted Odds Ratios (Controlling for Demographics) and Confidence Intervals (95 Percent) of *Community Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

		Odds of Past Year Marijuana Use		
Community Domain[1]	**Risk/Protective Factor**	**Adjusted OR**[2]	***p* value**	**95% CI**
Community Disorganization and Crime	Risk	1.52	<.0001	(1.40, 1.65)
Neighborhood Cohesiveness	Protective	0.86	<.0001	(0.81, 0.92)
Community Attitudes Toward Substance Use	Risk			
Multiple substance scale[3]		1.85	<.0001	(1.72, 1.99)
Marijuana (try once or twice)		1.72	<.0001	(1.61, 1.84)
Community Norms Toward Substance Use	Risk			
Multiple substance scale[3]		4.52	<.0001	(4.07, 5.02)
Marijuana (try once or twice)		3.72	<.0001	(3.41, 4.07)
Availability of Marijuana	Risk	2.34	<.0001	(2.19, 2.51)
Exposed to Prevention Messages in the Media	Protective	0.71	<.0001	(0.62, 0.80)

OR = odds ratio; CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.1). The coding and distribution of the responses for each factor are provided in Table 2.1.

[2] ORs are derived from multiple logistic regression models adjusted for age, gender, race/ethnicity, number of parents in home, household income, county type, and geographic region. ORs are based on separate logistic regression models of past year marijuana use for each of the factors. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.12 Adjusted Odds Ratios (Controlling for Demographics) and Confidence Intervals (95 Percent) of *Family Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

Family Domain[1]	Risk/Protective Factor	Odds of Past Year Marijuana Use		
		Adjusted OR[2]	*p* value	95% CI
Parental Monitoring	Risk	1.97	<.0001	(1.81, 2.15)
Parental Encouragement	Protective	0.64	<.0001	(0.60, 0.67)
Parental Attitudes Toward Substance Use	Risk			
Multiple substance scale[3]		2.63	<.0001	(2.38, 2.90)
Marijuana (try once or twice)		2.31	<.0001	(2.12, 2.52)
Parents Communicate About Substance Use	Protective	1.01	.8652	(0.91, 1.11)
Parents Are Source of Social Support	Protective	0.44	<.0001	(0.40, 0.49)

OR = odds ratio; CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.2). The coding and distribution of the responses for each factor are provided in Table 2.2.

[2] ORs are derived from multiple logistic regression models adjusted for age, gender, race/ethnicity, number of parents in home, household income, county type, and geographic region. ORs are based on separate logistic regression models of past year marijuana use for each of the factors. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.13 Adjusted Odds Ratios (Controlling for Demographics) and Confidence Intervals (95 Percent) of *Peer/Individual Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

Peer/Individual Domain[1]	Risk/Protective Factor	Adjusted OR[2]	*p* value	95% CI
Antisocial Behavior	Risk	8.01	<.0001	(6.64, 9.66)
Individual Attitudes Toward Substance Use	Risk			
Multiple substance scale[3]		3.85	<.0001	(3.59, 4.13)
Marijuana (try once or twice)		3.93	<.0001	(3.67, 4.20)
Friends' Attitudes Toward Substance Use	Risk			
Multiple substance scale[3]		3.76	<.0001	(3.51, 4.02)
Marijuana (try once or twice)		3.83	<.0001	(3.60, 4.07)
Friends' Substance Use	Risk			
Multiple substance scale[2]		6.74	<.0001	(6.16, 7.38)
Marijuana		5.39	<.0001	(4.99, 5.83)
Perceived Risk of Substance Use	Risk			
Multiple substance use[3]		3.82	<.0001	(3.52, 4.14)
Marijuana		3.23	<.0001	(3.04, 3.43)
Risk-Taking Proclivity	Risk	3.20	<.0001	(2.97, 3.45)
Participation in Two or More Extracurricular Activities	Protective	0.58	<.0001	(0.52, 0.64)
Religiosity	Protective	0.54	<.0001	(0.50, 0.57)

OR = odds ratio; CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.3). The coding and distribution of the responses for each factor are provided in Table 2.3.

[2] ORs are derived from multiple logistic regression models adjusted for age, gender, race/ethnicity, number of parents in home, household income, county type, and geographic region. ORs are based on separate logistic regression models of past year marijuana use for each of the factors. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 3.14 Adjusted Odds Ratios (Controlling for Demographics) and Confidence Intervals (95 Percent) of *School Domain* Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17: 1999

School Domain[1]	Risk/Protective Factor	Adjusted OR[2]	*p* value	95% CI
		Odds of Past Year Marijuana Use		
Commitment to School	Protective	0.46	<.0001	(0.43, 0.50)
Sanctions Against Substance Use at School	Protective			
Multiple substance scale[3]		0.44	<.0001	(0.38, 0.51)
Illegal drugs		0.60	<.0001	(0.52, 0.70)
Perceived Prevalence of Substance Use	Risk			
Multiple substance scale[3]		4.76	<.0001	(4.24, 5.33)
Marijuana		4.07	<.0001	(3.72, 4.46)
Academic Performance	Risk	1.77	<.0001	(1.65, 1.89)
Exposed to Prevention Messages in School	Protective	0.77	<.0001	(0.69, 0.87)

OR = odds ratio; CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.

[2] ORs are derived from multiple logistic regression models adjusted for age, gender, race/ethnicity, number of parents in home, household income, county type, and geographic region. ORs are based on separate logistic regression models of past year marijuana use for each of the factors. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Chapter 4. Prediction of Past Year Substance Use Using Multiple Regression Models

4.1   Introduction

Earlier chapters, using descriptive statistics and simple odds ratios (ORs), presented the prevalence of risk and protective factors and the associations of those factors with past year marijuana use. This chapter presents the strength of the relationship between risk and protective factors and marijuana use using multiple logistic regression models, in which the associations with past year marijuana use are adjusted for both demographic variables and other risk and protective factors included in the models. This chapter addresses the following issues:

- the relative importance of each risk and protective domain in predicting past year marijuana use;

- the importance of demographic factors in predicting past year marijuana use;

- how much risk and protective factors from each domain add to the prediction of past year marijuana use beyond the demographic factors;

- the importance of demographic variables combined with the full set of risk and protective factors in explaining the variation in past year marijuana use; and

- the usefulness of hierarchical modeling techniques in explaining the variation in past year marijuana use.

The word "prediction" is used not to imply that events have occurred in a certain sequence, but to describe a statistical question: "How well does statistical information about one characteristic improve one's ability to guess what happened to a different characteristic?" For example, if knowing the employment status of each person in a group would improve how well early initiation of marijuana use could be estimated, employment status would be called a "predictor," without necessarily meaning that employment status came first. Moreover, there are statistical methods for determining just how strong a predictor employment status may prove to be in any given group of people. When a number of predictors are used together in a statistical analysis of this kind, the combination of predictors is referred to as a "prediction model."

Because of the complex survey design of the National Household Survey on Drug Abuse (NHSDA), the regression analyses were performed using the LOGISTIC procedure in SUrvey DAta ANalysis (SUDAAN), a statistical program employing variance estimation calculations

that take into account this complexity (Shah, Barnwell, & Bieler, 1998). Note that the initial analyses use simple individual (person-level) logistic regression models that adjust for the effects of clustering on the estimates but otherwise ignore the true hierarchical structure of the data, namely, the fact that youths aged 12 to 17 are nested within families that are, in turn, nested in neighborhoods. Therefore, these analyses treat variables at the higher levels of hierarchy as being individual (youth) variables.[17] Analyses presented later in the chapter address the hierarchical structure of the data and the utility of including this structure in prediction models.

Multiple logistic regression determines the importance of individual predictor variables by testing whether these factors account for a statistically significant amount of variation in the dependent variable after controlling for other predictor variables included in the model. Multiple logistic regression can also determine the relative importance of groups of variables by measuring how much (additional) variation in the dependent variable that one group of predictor variables can explain beyond another group of variables. The lack of statistical significance of a predictor variable does not imply that the variable is unimportant in the epidemiology of substance use. For example, the variable may have a significant indirect relationship to the dependent variable through another independent variable in a path analysis. Other analysis techniques, such as structural equation modeling, may be more appropriate for analyzing those relationships.

First, results are presented for individual-level models predicting past year use of marijuana. This involves a comparison of the explained variation of each of the four domains as well as a "full model" that contains a set of demographic variables and factors from all four domains. Second, results are presented for individual-level models predicting past year use of cigarettes and alcohol. Third, simple hierarchical models are used to highlight the difference between hierarchical models and ordinary least squares models.

4.2   Past Year Use of Marijuana

4.2.1   Comparisons Between Domains

In this section, three separate multiple regression models of past year marijuana use are presented for each of the four domains discussed in Chapter 1.[18] The first regression model

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[17] Other work (Wright & Zhang, 1999) has indicated that the family and neighborhood levels can account for 20 to 25 percent of the overall variation in drug use (the remainder being attributed to the person level). In this situation, treating the analysis as a person-level analysis could result in somewhat different estimates of the association between risk and protective factors and past year marijuana use.

[18] For risk and protective factors focused specifically on substance use, the questions specific to marijuana use (rather than the use of other substances) were used in these models.

(Model 1) includes only a set of demographic variables: race/ethnicity, gender, age, number of parents in the home, household income, geographic region, and county type. The second model (Model 2) includes all the risk and protective factors that comprise the domain. The third model (Model 3) includes both the set of demographic variables as well as the risk and protective factors that comprise the domain. Comparisons of Model 2 with Model 1 assess whether the set of factors that make up each domain are more or less predictive of past year marijuana use than the set of demographic variables. Comparisons of Model 3 with Model 2 assess the extent to which the addition of the set of demographic factors improves the predictiveness of the set of risk and protective factors that comprise the domain.

The results of these models are presented in Tables 4.1 through 4.4, with each domain presented in a separate table. For each model, these tables present the regression coefficient (or β) and OR for each predictor, a significance test for each predictor, and two measures that summarize the explanatory power for the model as a whole. The OR is easier to understand than the regression coefficient, both of which are measures that describe the strength and direction of the relationship between the predictors and past year marijuana use. For example in Table 4.1, the OR for gender indicates that the odds of past year marijuana use were 1.18 times higher for males than for females, after controlling for other demographic variables.[19] The *p* value for this is less than 0.05, indicating that gender is a significant variable in Model 1 after controlling for the other demographic variables. With the exception of the comparison between Hispanic youths and white youths, there were significant associations between each demographic variable and past year marijuana use in Model 1.

The summary measures in Table 4.1 indicate that the set of community domain factors (Model 2) accounted for significantly more variance ($R^2 = 0.17$; $R_N^2 = 0.31$) than the demographic variables in Model 1 ($R^2 = 0.09$; $R_N^2 = 0.15$).[20] The addition of the demographic variables to the model with the community domain factors (Model 3) resulted in only a slight improvement in explanatory power ($R^2 = 0.19$; $R_N^2 = 0.34$) compared with Model 2. The results were similar for the peer/individual domain (Table 4.3) and the school domain (Table 4.4). In

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[19] If p_i indicates the probability that ith individual used marijuana in the past year, $\eta_i = \log [p_i / (1 - p_i)]$ and $\eta_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + ... + \beta_q X_{qi}$. The coefficients β_j are related to the odds of using marijuana and to the OR in the following way. The odds of using marijuana in the past year is increased by $\exp(\beta_i)$ for every unit increase in X_j. In particular, when X_j is a 0-1 indicator variable, $\exp(\beta_i)$ is the OR for an individual for whom $X_j = 1$, compared with an individual whose $X_j = 0$, with all other X_j's remaining the same.

[20] The first measure is Cox and Snell's R^2, a measure of the fit of the model defined as $1 - [L(O) / L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and n is the sample size. For further information, refer to SUDAAN Manual 7.5 (Shah et al., 1998) and Cox and Snell (1989). The second measure is Nagelkerke's R_N^2. Recognizing that Cox and Snell's R^2 reaches a maximum for discrete models that depends on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

both of these domains, the risk and protective factors that comprised the domains (Model 2) accounted for significantly more variance than the demographic variables (Model 1), and the addition of the demographic variables to the factors in these domains (Model 3) did little to improve the model. In the family domain (Table 4.2), the set of risk and protective factors accounted for a similar amount of variance ($R^2 = 0.10$; $R_N^2 = 0.17$) compared with the set of demographics. In addition, the model that included the set of family risk and protective factors and the set of demographic variables accounted for significantly more variation ($R^2 = 0.15$; $R_N^2 = 0.25$) than the model that included only the set of family domain factors.

Of the four domains, the factors in the peer/individual domain accounted for the most variation in past year marijuana use by youths ($R^2 = 0.30$; $R_N^2 = 0.53$). Following this were the community domain ($R^2 = 0.19$; $R_N^2 = 0.34$) and the school domain ($R^2 = 0.18$; $R_N^2 = 0.32$). The family domain accounted for the least amount of variation in past year marijuana use ($R^2 = 0.15$; $R_N^2 = 0.25$). However, it should be noted that these estimates of relative contribution are based only on the items used to measure these constructs and the methodology of the 1999 NHSDA. It could be that other measures of these constructs, or other research methodologies, would result in different relative contributions for these domains.

4.2.2   Full Model, Across Domains

In this section, tables are presented in which certain risk and protective factors from all four domains were combined into a single model. Table 4.5 presents a "combined reduced" model that includes the set of demographic variables as well as all of the risk and protective factors that were significant predictors of past year marijuana use in Model 3 of Tables 4.1 through 4.4. Collectively, this set of variables accounted for more variation in past year marijuana use ($R^2 = 0.33$; $R_N^2 = 0.56$) than any of the domains individually. However, this combined reduced model improved only slightly on the variance accounted for by the model that contained only demographics and the factors in peer/individual domain (see Model 3 of Table 4.3).

The combined reduced model presented in Table 4.5 included all of the risk and protective factors that were significant in the test of the different domains. As a result, some of the factors in the combined reduced model were not significant. In an effort to obtain a more parsimonious model, a "final" model was created that included the set of demographic variables as well as the risk and protective factors that were significant in the combined reduced model (Table 4.6). This final model accounted for the same amount of variation as the combined reduced model. These results indicate that the variables in this model accounted for a significant percentage of the total variation in whether a youth used marijuana in the past year. To the extent that the model includes risk and protective factors that have been demonstrated in well-designed prevention programs to reduce marijuana use, application of such programs has the potential of

reducing youth marijuana use. By contrast, if the prevention factors had only accounted for a small percentage of the total variation, this could raise concern that programs aimed at reducing the levels of the variables in the model might not reduce usage of marijuana among youths in a significant way. It is worth emphasizing that the NHSDA is an annual cross-sectional survey that provides a snapshot of the relationship between these risk and protective factors and marijuana use for youths who have been surveyed at some point during 1999. A number of youths aged 12 to 17 reported that they used marijuana in the past year and indicated the presence of various risk or protective factors. However, the use of marijuana may have preceded the presence of the risk factor for some youths, resulting in a somewhat "inflated" R_N^2. Therefore, one should be cautious in drawing conclusions about youth marijuana use from the set of risk and protective factors reported in the NHSDA.

In the final model, the strongest associations with past year marijuana were found with the risk factors in the peer/individual domain; youths were more likely to have used marijuana in the past year if they reported higher levels of antisocial behavior (OR = 2.13), had friends who used marijuana (OR = 2.07), perceived low risks from marijuana use (OR = 1.79), and had more positive individual attitudes toward marijuana use (OR = 1.71) (Table 4.6). Among the protective factors, youths were less likely to have used marijuana in the past year if they listed their parents as a source of social support (OR = 0.71) and if they had been exposed to prevention messages in the media (OR = 0.81).

There were some variables that had ORs that were counterintuitive. One reason this can occur is the cross-sectional nature of the survey. For example, the final model indicated that youths were more likely to have used marijuana in the past year if their parents had talked with them about the dangers of substance use in the past year (OR = 1.55). This association does not necessarily indicate that parental communication with youths about the dangers of substance use increases the likelihood that they will use marijuana; it is possible that this association is the result of increased communication about the dangers of substance use among parents who know or suspect that their children are using, or are in danger of using, marijuana. Another reason for ORs that are counterintuitive to expectations is that the association between a given variable and marijuana use can be affected by the inclusion of other variables in the model. For example, Model 1 in Table 4.1 indicated that males were more likely to have used marijuana in the past year (OR = 1.18) compared with females. The final model, however, indicated that after controlling for risk and protective factors from all domains, males were less likely to have used marijuana in the past year (OR = 0.85) than females.

A small number of the risk factors in the final model were highly correlated with each other (see Tables A.9 to A.11 in Appendix A for intercorrelations between factors). For example, friends' use of marijuana was highly correlated ($r = 0.67$) with perceived prevalence of marijuana at school. This type of "multicollinearity" of predictors can be problematic, as it can

reduce the ability of each individual predictor to make a unique contribution to explained variation in the outcome measure (Cohen & Cohen, 1983). To test whether these high intercorrelations had a sizable effect on the final model, the model was repeated after eliminating three variables: friends' use of marijuana, friends' attitude toward marijuana use, and perceived prevalence of marijuana use at school. Eliminating these three variables acted to eliminate all correlations higher than $r = 0.50$ from the set of predictors. The removal of these factors, all of which were significant predictors of past year marijuana use in the final model (Table 4.6), had little effect; the adjusted R^2 of this reduced model was only slightly lower ($R_N^2 = 0.52$) compared with the final model ($R_N^2 = 0.57$). In addition, the fact that all three of these variables were significant in the final model, in which all predictors were adjusted for the other predictors in the model, suggests that each does account for unique variation in past year marijuana use among youths.

4.3   Past Year Use of Cigarettes and Alcohol

Models predicting past year use of cigarettes are presented in Tables 4.7 through 4.9. Table 4.7 presents the results of four models; each model contained the risk and protective factors from one domain,[21] in addition to the set of demographic variables. The factors that were significant in these models, along with the demographic variables were then included in the combined reduced model (Table 4.8). The risk and protective factors that were significant in the combined reduced model were then included in the final model (Table 4.9). Similar models predicting any past year use of alcohol are presented in Tables 4.10 through 4.12.[22]

In terms of explained variation as measured by the Nagelkerke R^2, the final models for past year cigarette use ($R^2 = 0.29$; $R_N^2 = 0.43$) and past year alcohol use ($R^2 = 0.34$; $R_N^2 = 0.46$) accounted for less variation than the final model for past year marijuana use ($R^2 = 0.33$; $R_N^2 = 0.56$).[23] As was the case for the final model of past year use of marijuana, the strongest predictors of past year cigarette and alcohol use were the peer/individual risk factors. Friends' use of cigarettes and friends' use of alcohol were the strongest predictors in these models.

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[21] For risk and protective factors focused specifically on substance use, the questions specific to cigarette or tobacco use (rather than the use of other substances) were used in these models.

[22] For factors focused specifically on substance use, the questions specific to alcohol use were used in these models.

[23] Note that Cox and Snell's R^2 for the final model predicting past year alcohol use was slightly higher (0.34) than Cox and Snell's R^2 for the final model predicting past year marijuana use (0.33). The Nagelkerke adjustment led to a greater increase in the R^2 for the marijuana model than the alcohol model because the prevalence rates among youths were considerably lower for past year marijuana use compared with past year alcohol use.

4.4 Hierarchical Models

The following discussion provides some general background to hierarchical modeling and some simple models. Raudenbush and Bryk (2002) provide further information on the diversity and advantages of hierarchical models.

4.4.1 Background

Hierarchical modeling has been described under a variety of names historically: mixed-effects models, random-effects models, random-coefficient regression models, and covariance components models. Raudenbush and Bryk (2002, pp. 5-6) give the following description for these types of mixed models:

> The models discussed in this book appear in diverse literatures under a variety of titles. In sociological research, they are often referred to as *multilevel linear models* (cf. Goldstein, 1995; Mason et al., 1983). In biometric applications, the terms *mixed-effects models* and *random-effects models* are common (cf. Elston & Grizzle, 1962; Laird & Ware, 1982; Singer, 1998). They are also called *random-coefficient regression models* in the econometrics literature (cf. Rosenberg, 1973; Longford, 1993) and in the statistical literature have been referred to as *covariance components models* (cf. Dempster, Rubin, & Tsutakawa, 1981; Longford, 1987).

In this report, the above models are referred to collectively as *hierarchical models* in order to emphasize the nested and clustered nature of the data that has a direct impact on assumptions about dependence of observations within and across hierarchical levels. There has been a significant amount of analysis in areas such as education (Bock, 1989; Bryk, Thum, Easton, & Luppescu, 1998; Morris, 1995). In elementary and secondary education, one typical structure consists of students nested within classrooms, which are in turn nested within schools, which are nested within school districts. Another type of structure is repeated measures, where observations over time are nested within an individual. The focus of much of that analysis has been on the effects of school administration and quality of teachers, or teaching, on student achievement. Although there has been some application of these models to the field of substance use (i.e., Duncan, Duncan, Hops, & Alpert, 1997; Kreft, 1994; Novak & Clayton, 2001), their application has not been as prevalent in the field of substance use as in the field of education.

In the current study, the focus regarding hierarchical models is the effect of family and community characteristics on the use of marijuana by youths aged 12 to17. The prevention literature includes numerous risk and protective factors for youth substance use that are a function of family or community characteristics; those included in the 1999 NHSDA are listed in Tables A.1 and A.2 in Appendix A.

Historically, analyses in a variety of areas treated clustered observations as independent—failing to account for the fact that units within the same cluster tend to be more similar to each other than to units outside the cluster.[24] For example, members of the same family or persons in the same neighborhood tend to share characteristics that make them more similar to each other than to other persons. One result of assuming independent observations at the person level when that is not true is that the researcher may conclude that certain explanatory variables are significant (i.e., significantly different from 0), when in fact, they are not. Because within-cluster correlation tends to be positive, a realistic effective sample size is typically smaller than the nominal sample size. Hence, variances estimated under the independence assumption tend to be too small. Another result of assuming independent observations at the person level is that it has "fostered an impoverished conceptualization, discouraging the formation of explicit multilevel models with hypotheses about effects occurring at each level and across levels" (Raudenbush & Bryk, 2002, p. 5). In the case of continuous data, the classical assumptions are that the observations are independently normally distributed and the model residuals have a common mean and variance. It is not necessary, however, to make these restrictive assumptions if they are unrealistic.

In the case of a model in which the dependent variable of interest is dichotomous (e.g., used or did not use marijuana in the past year), the observations are conditionally Bernoulli distributed (a special case of the binomial) given the explanatory variables, and the predicted probabilities of "success" are typically transformed by taking the log of the odds (the logit function). However, in this form there are difficulties in describing how much of the total variation in the dependent variable has been "explained" by the model because the measures of variance and explained variation are also in the log odds metric. Some of the issues involved in accurately estimating the parameters of a hierarchical model when the dependent variable is binary are discussed in Rodriguez and Goldman (1995) and Goldstein and Rasbash (1996).

In a nested hierarchical design, when the original data are normally distributed, the total variation in the dependent variable can be broken down into components at each level of the hierarchy. For example, if the dependent variable were the student math achievement score on a test and those scores followed a normal distribution, the total variation could be partitioned into the part deriving from student variation (within schools) and the part from school variation (between schools). The first part would be determined by the variation *among students within a school*, averaged over all schools. The second part would be characterized by the variation in the

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[24] Analyses presented in the earlier chapters have utilized SUDAAN software (Shah et al., 1998), which can address the special circumstances of complex survey data, including the use of stratification, sampling weights, and the clustering of observations. Given a two-level structure (e.g., persons nested within neighborhoods), SUDAAN can provide unbiased estimates for person-level characteristics, including estimates of precision. However, it cannot estimate the separate variance components, nor can it be used to estimate separate models for each hierarchical level.

average student score *between schools*. The percentage of total variation that is between schools then is an indication of the magnitude of influence in student scores that is determined by school characteristics. The interest then might be in identifying what those school characteristics are that lead to higher math achievement scores given the same set of students.

When the dependent variable is dichotomous, as it is for past year use of marijuana, and the predicted probabilities of "success" have been transformed into the log odds metric, the predicted probabilities of success can be retransformed into the original metric, which can be used in predicting prevalences.[25] From such analysis, the overall variance for past year use of marijuana can be partitioned into three parts corresponding to variation accounted for by the person level, the family level, and the neighborhood level. The person level refers to the individual choices that a youth makes to either use or not use a substance. The family level refers to the degree of influence the family with whom a youth lives has on the youth's substance use. The neighborhood level refers to the degree of influence the neighborhood in which a youth lives has on the youth's substance use. The partitioning described in this report assumes a nested structure in which youths live in households (referred to as families), and the households are situated in neighborhoods (defined by groups of contiguous Census blocks, which are the first stage of sampling for the NHSDA). Analyses using the 1999 NHSDA have indicated that the person level accounts for 78 percent of the total variation in past year marijuana use among youths, the family accounts for 16 percent of the total, and the neighborhood accounts for the remaining 6 percent.[26] One way to interpret this information is that youth reports about using marijuana in the past year appear to be mostly influenced by their own choices (78 percent) and not by the family (16 percent) or neighborhood (6 percent). Experience with these percentages for different NHSDA years confirms that the percentages have remained fairly constant.

Another way to better understand this information is to consider what the estimates would have been under other circumstances. If youths in each neighborhood (group of contiguous Census blocks) included in the survey reported the same percentage of marijuana use in the past year (e.g., 10 percent of youths in every sampled neighborhood reported using marijuana in the past year), the variation accounted for by the neighborhood level would have been 0 percent. If, on the other hand, there was a large amount of variation between neighborhoods in the youth reports of marijuana use (e.g., a small percentage of youths in some of the sampled neighborhoods reported use whereas a large percentage of youths in other

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[25] Snijders and Bosker (1999) provided some approximations for this that work well when the prevalence rate of the dependent variable is not too small.

[26] These estimates are based on the 1999 NHSDA from responses of 3,902 pairs of youths aged 12 to 17 residing in eligible households in a total of 2,774 segments (groups of contiguous Census blocks). This analysis does not address youths in households in which there was only a single child in the age range. Of all youths aged 12 to 17 in 1999, approximately 49 percent were in households that included at least two youths aged 12 to 17.

sampled neighborhoods reported use), the neighborhood level would have accounted for a large percentage of the total variation. At the family level, if youth marijuana use was completely controlled by factors that exist within the household in which a youth lives (e.g., the influence of parents and siblings), all youths living in the same household would report the same level of marijuana use. In this case, the total variation in youth marijuana use accounted for by the family level would be larger, and variation accounted for by the person level would be smaller.

It is important to state that the contributions of the family and neighborhood presented in this report are overall results for the United States for youths aged 12 to 17. It is likely that the actual impact by the family (e.g., the impact of parents) or the neighborhood differ for different demographic groups within the overall youth population. For example, some cross-sectional research has suggested that the influence of parents on the behavior of youths decreases as youths get older (Kandel, 1996; Krosnick & Judd, 1982). To the extent that this true, family-level variables may account for more variation in the substance use of youths aged 12 to 14 than youths aged 15 to 17. Because of this perception of greater parental influence during early adolescence, and because most youths do not initiate substance use before age 12 (Gfroerer, Wu, & Penne, 2002), most family-based prevention programs labeled as "model programs" by the Center for Substance Abuse Prevention (CSAP, 2001) are targeted toward youths in their preteen or early-teenage years.

4.4.2 Models

To simplify the discussion of the advantages of hierarchical modeling, the analysis presented below focuses on a continuous measure of perceived risk of marijuana use (RSKMJUSE) rather than the dichotomous measure of past year marijuana use that was employed in previous models. The use of a scaled continuous variable that is assumed to be normally distributed simplifies the discussion by rendering the interpretation of explained variation easier to understand. Perceived risk is a scaled variable based on the average of responses to two questions: "How much do people risk harming themselves physically and in other ways when they smoke marijuana once a month?" and "How much do you think people risk harming themselves physically and in other ways when they smoke marijuana once or twice a week?" The response options for both questions are (1) great risk, (2) moderate risk, (3) slight risk, and (4) no risk. Perceived risk of marijuana use is typically closely associated with marijuana use among youths. For example, the 1999 NHSDA indicated that 52.2 percent of youths who perceived no risk of using marijuana once a month had used marijuana in the past year compared with 24.7 percent among those who perceived slight risk, 9.0 percent among those who perceived moderate risk, and only 4.6 percent among those who perceived great risk.

A series of models were fit in which three covariates that might reasonably be expected to have explanatory power at the community, family, and individual levels were introduced

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Exhibit 4.1 Estimates of Variance Components, Estimates of Fixed Effects, and Standard Errors for Hierarchical Models for Perceived Risk of Marijuana Use as Functions of Community-Level, Family-Level, and Person-Level Explanatory Variables: 1999

Model	Estimates of Variance Components				Estimates of Fixed Effects			
	Community Level (SE)	Family Level (SE)	Person Level (SE)	Total[1] (SE)	Community Level (SE)	Family Level (SE)	Person Level (SE)	Intercept (SE)
1. Random Effects (RE) Only	.026 (.004)	.125 (.011)	.556 (.011)	.707 (.016)	--	--	--	1.831 (.006)
2. (RE) & Community (C)	.013 (.003)	.121 (.011)	.557 (.011)	.691 (.016)	.247 (.011)	--	--	1.830 (.006)
3. (RE) & (C) & Family (F)	.011 (.003)	.092 (.011)	.551 (.011)	.654 (.016)	.209 (.011)	.204 (.006)	--	1.830 (.006)
4. (RE) & (C) & (F) & Person (P)	.011 (.003)	.075 (.009)	.491 (.010)	.577 (.016)	.138 (.010)	.098 (.006)	.300 (.005)	1.830 (.005)
5. Fixed Effects (FE) Only	--	--	.576 (.005)	.576 (.005)	.139 (.010)	.098 (.006)	.302 (.005)	1.829 (.005)

Legend: Model 1 (random effects only) has no fixed effects but includes random effects at the person, family, and community level. Model 2 includes the same three random effects, as well as a community-level fixed effect (C) (approached by someone selling drugs). Model 3 has the same effects as Model 2, as well as a family-level fixed effect (F) (parents helped with homework during the past year). Model 4 has the same effects as Model 3, as well as a person-level fixed effect (P) (favorable attitude toward drug use). Model 5 includes only the fixed effects for the community, family, and person levels.

[1] The total column is the sum of the community-, family-, and person-level columns and indicates the total variation left unexplained by the model. The total variance in Model 1 (.707), which contains only random effects, represents the total unexplained variation in the perceived risk of marijuana use. For Models 2 to 4, the total column indicates how much of the explainable variation in the perceived risk of marijuana use is left unexplained after adding fixed effects to the random effects. For example, Model 4, which includes the random effects of Model 1 plus three fixed effects (one variable for each of the levels), indicates that 82 percent (.577/.707 x 100) of the total variation is still unexplained; however, the hierarchical model indicates how much is unexplained (equal to 1 minus the percentage of explained variation) at each of the three levels. Model 5 is a single-level (person-level) model that treats each of the fixed effect variables as person-level variables. The total unexplained variation in Model 5 is the same (approximately) as that for Model 4, but in Model 5 there is no information about the variance components at each of the levels. Also, the standard error of the total variance in Model 5 is understated because the clustering of persons is not taken into account.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

sequentially. The definition of community used in the present study is the segment, which is a Census block or group of contiguous Census blocks (where the blocks are those defined by the U.S. Bureau of the Census). The *community-level variable* was a dichotomous measure (yes/no) asking whether the youth had been approached by a drug seller in the past 30 days. As a perceived community-level variable, the responses to this question were "averaged up" to the community (segment) level. Put another way, the mean value of all respondents in a given segment was calculated, and all respondents in that segment were assigned this mean value for this variable. The *family-level* variable was how often parents had helped the youth with homework during the past 12 months. The response options for this question were (1) never, (2) seldom, (3) sometimes, or (4) always. A maximum of two youths from the same family could be included in the 1999 NHSDA; in cases where two youths from the same family were interviewed, each youth was assigned the average of the responses for the two youths in the family. The *person-level variable* was a scaled score measuring the youths' attitude toward youth substance use, assessed using three questions asking "How do you feel about someone your age trying (marijuana/hashish once or twice) (smoking one or two packs of cigarettes per day) (having one or more drinks of an alcoholic beverage nearly every day)?" The response options for each question were (1) strongly disapprove, (2) somewhat disapprove, or (3) neither approve nor disapprove.

Exhibit 4.1, shown on the facing page, presents the estimates of variance components for each level, the total variance estimates, the fixed effects estimates, and the standard errors of five models involving these variables. For completeness, both fixed effects as well as random effects are included. The discussion centers on the estimates of variance components because these illustrate the main points of interest. The model assumptions are summarized below as model equations of the form $Y_{ijk} = Fixed\ effects + Random\ effects$, where the random effects are assumed to be independently normally distributed. The Y variable is perceived risk of marijuana use (RSKMJUSE). The analysis does not use the sample weights and is focused on a few simple models to assess whether the hierarchical modeling represents an improvement over a strictly person-level model. The software used was MlwiN (Version 1.1).

Model 1 simply contained a constant and a random effect for each level of the hierarchy. This model can be represented using the following notation:

$$RSKMJUSE_{ijk} = B_0 + v_{0k} + u_{0jk} + e_{0ijk}\ .$$

In this notation, $RSKMJUSE_{ijk}$ denotes the ith individual, in the jth family, in the kth neighborhood (segment), B_0 is the fixed intercept, v_0 is the random effect of the neighborhood, u_0 is the random effect of the family, and e_0 is the random effect of the individual. The random effects are assumed to be mutually statistically independent with zero means and variances $var(v_0)$, $var(u_0)$, $var(e_0)$. The total variation explained by this model, determined by summing

across the three levels, was .026 + .125 + .556 = .707 (Exhibit 4.1). Most of the variation is at the person level: .556 / .707 = 79 percent of the total variation. The second largest component is at the family level, .125 (18 percent of the total). The remaining variation, .026 (about 3 percent of the total), is at the neighborhood level.

Model 2 contained the random effects included in Model 1, and also included the fixed effect for the community-level variable (COMMUNITY) asking about being approached by a drug seller in the past 30 days. The model then became

$$RSKMJUSE_{ijk} = B_0 + B_{1k} * COMMUNITY + v_{0k} + u_{0jk} + e_{0ijk} .$$

The error terms are now residual variances. The results indicate that compared with Model 1, the community-level variation remaining (to be explained) dropped by half from .026 to .013. The family variation dropped slightly, from .125 to .121. The person-level variation was similar to Model 1's.

Model 3 contained the effects included in Model 2 (random effects and the fixed effects for the community-level), as well as the fixed effect for the family-level variable (FAMILY) asking how often parents help youths with their homework. The model then became

$$RSKMJUSE_{ijk} = B_0 + B_{1k} * COMMUNITY + B_{2jk} * FAMILY + v_{0k} + u_{0jk} + e_{0ijk} .$$

Compared with Model 2, the family-level variation dropped from .121 to .092. The community-level variation dropped slightly from .013 to .011. The person-level variation remaining dropped slightly from .557 to .551.

Model 4 contained the effects included in Model 3 (random effects as well as fixed effects at the community and family levels), and it also included the fixed effects for the person-level variable (PERSON) asking about positive attitudes toward drug use. The model then became

$$RSKMJUSE_{ijk} = B_0 + B_{1k} * COMMUNITY + B_{2jk} * FAMILY + B_{3ijk} * PERSON + v_{0k} + u_{0jk} + e_{0ijk} .$$

Compared with Model 3, the person-level variation fell from .551 to .491. The family-level variation also dropped slightly from .092 to .075. The community-level variation remained unchanged.

In Model 4, approximately 18 percent of the total variation ($[1 - (.577 / .707)] \times 100 = 18.4$ percent) has been explained. Among the variables at the different levels, approximately 12 percent of the person-level variation has been explained ($[1 - (.491 / .556)] \times 100 = 11.7$ percent);

40 percent of the family-level variation has been explained ($[1 - (.075 / .125)] \times 100 = 40.0$ percent); and 58 percent of the community-level variation has been explained ($[1 - (.011 / .026)] \times 100 = 57.7$ percent).

Model 5, for comparison purposes, contained only the individual-level regression model (i.e., fixed effects for the community, family, and person-level variables). This model can be represented using the following notation:

$$RSKMJUSE_{ijk} = B_0 + B_{1k} * COMMUNITY + B_{2jk} * FAMILY + B_{3ijk} * PERSON + e_{0ijk} \, .$$

This indicates that the overall total variation is similar (.576 for Model 5 and .577 for Model 4), but Model 5 does not include information on how much of the variation has been explained at each level. In addition, the standard errors for the estimates of the fixed effects of the variables B_0, B_1, B_2, and B_3 from Model 5 would typically be somewhat smaller (underestimates) than those reported in Models 2 to 4 because they would assume independence within the family and within the neighborhood. However, there is little difference between these standard errors in this case because of the magnitude of the individual-level variation (relative to the family and neighborhood components) and the large overall sample size.

4.4.3   Comments

The examples above are meant to clarify some of the differences between hierarchical models and ordinary least squares individual-level regression models, especially the incorporation of the correct assumptions about dependence among observations and the improved understanding of explained variation based on multiple levels of variation. It should be noted that there are numerous additional advantages to hierarchical modeling, such as the ability to build separate regression models at each level of the hierarchy, and to further relax assumptions so that both the individual coefficients (slopes) can vary across units at the same level as can the variances of those units (Raudenbush & Bryk, 2002).

Table 4.1 Results of Logistic Regression Models Predicting Past Year *Marijuana Use* with Demographics and *Community Domain* Risk and Protective Factors among Youths Aged 12 to 17: 1999

	Model 1: Demographics				Model 2: Community Risk/Protective Factors				Model 3: Demographics + Community Risk/Protective Factors			
	β	OR[1]	95% CI	*p* value	β	OR[1]	95% CI	*p* value	β	OR[1]	95% CI	*p* value
Intercept	-9.06	--	--	<.0001	-6.67	--	--	<.0001	-10.50	--	--	<.0001
Demographics												
Race/ethnicity												
Black vs. white	-0.43	0.65	(0.55, 0.78)	<.0001	--	--	--	--	-0.72	0.49	(0.40, 0.60)	<.0001
Hispanic vs. white	-0.10	0.90	(0.76, 1.06)	.2155	--	--	--	--	-0.10	0.90	(0.75, 1.09)	.2767
Other vs. white	-0.39	0.67	(0.50, 0.91)	.0095	--	--	--	--	-0.03	0.97	(0.68, 1.37)	.5120
Gender - male vs. female	0.16	1.18	(1.07, 1.29)	.0008	--	--	--	--	0.15	1.16	(1.05, 1.29)	.0480
Age (continuous - 12 to 17)	0.52	1.68	(1.63, 1.72)	<.0001	--	--	--	--	0.30	1.35	(1.30, 1.40)	<.0001
Number of parents in home (2 vs. others)	-0.67	0.51	(0.46, 0.57)	<.0001	--	--	--	--	-0.44	0.65	(0.57, 0.73)	<.0001
Economic deprivation (household income under $20,000)	-0.16	0.85	(0.74, 0.98)	.0242	--	--	--	--	-0.25	0.78	(0.65, 0.92)	.0038
Geographic region												
Northeast vs. West	-0.20	0.82	(0.70, 0.96)	.0119	--	--	--	--	-0.11	0.89	(0.75, 1.06)	.2007
North Central vs. West	-0.17	0.84	(0.73, 0.96)	.0127	--	--	--	--	-0.13	0.88	(0.75, 1.03)	.1161
South vs. West	-0.26	0.77	(0.68, 0.88)	.0001	--	--	--	--	-0.15	0.86	(0.75, 1.00)	.0442
County type												
Large MSA vs. non-MSA	0.19	1.21	(1.07, 1.36)	.0023	--	--	--	--	0.16	1.17	(1.03, 1.34)	.0190
Small MSA vs. non-MSA	0.21	1.24	(1.09, 1.41)	.0008	--	--	--	--	0.17	1.19	(1.03, 1.36)	.0149
Community Domain[2]												
Community disorganization and crime	--	--	--	--	-0.15	0.86	(0.79, 0.95)	.0017	0.00	1.00	(0.91, 1.10)	.9587
Neighborhood cohesiveness	--	--	--	--	0.01	1.01	(0.94, 1.09)	.7262	0.03	1.03	(0.96, 1.11)	.4024
Community attitudes toward marijuana use	--	--	--	--	0.37	1.44	(1.33, 1.56)	<.0001	0.29	1.34	(1.23, 1.45)	<.0001
Community norms toward marijuana use	--	--	--	--	1.00	2.71	(2.48, 2.97)	<.0001	0.99	2.70	(2.46, 2.96)	<.0001
Availability of marijuana	--	--	--	--	0.82	2.26	(2.12, 2.41)	<.0001	0.68	1.97	(1.84, 2.12)	<.0001
Exposed to prevention messages in the media	--	--	--	--	-0.25	0.78	(0.67, 0.90)	.0006	-0.26	0.77	(0.67, 0.89)	.0006
Sample size		25,357				23,031				23,031		
R^2 (see footnote 3)		0.09				0.17				0.19		
R_N^2 (see footnote 4)		0.15				0.31				0.34		

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

[1]ORs are derived from multiple logistic regression models and adjusted for other variables included in each model. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[2]The questions used to measure each of the factors are provided in Appendix A (Table A.1). The coding and distribution of the responses for each factor are provided in Table 2.1.

[3]Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1-[L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and *n* is the sample size.

[4] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.2 Results of Logistic Regression Models Predicting Past Year *Marijuana Use* with Demographics and *Family Domain* Risk and Protective Factors among Youths Aged 12 to 17: 1999

	Model 1: Demographics				Model 2: Family Risk/Protective Factors				Model 3: Demographics + Family Risk/Protective Factors			
	β	OR[1]	95% CI	p value	β	OR[1]	95% CI	p value	β	OR[1]	95% CI	p value
Intercept	-9.06	--	--	<.0001	-3.59	--	--	<.0001	-9.25	--	--	<.0001
Demographics												
Race/ethnicity												
Black vs. white	-0.43	0.65	(0.55, 0.78)	<.0001	--	--	--	--	-0.34	0.71	(0.58, 0.88)	.0014
Hispanic vs. white	-0.1	0.90	(0.76, 1.06)	.2155	--	--	--	--	0.09	1.09	(0.89, 1.34)	.3856
Other vs. white	-0.39	0.67	(0.50, 0.91)	.0095	--	--	--	--	-0.39	0.67	(0.47, 0.96)	.0312
Gender - male vs. female	0.16	1.18	(1.07, 1.29)	.0008	--	--	--	--	0.13	1.14	(1.02, 1.28)	.0189
Age (continuous - 12 to 17)	0.52	1.68	(1.63, 1.72)	<.0001	--	--	--	--	0.44	1.56	(1.50, 1.61)	<.0001
Number of parents in home (2 vs. others)	-0.67	0.51	(0.46, 0.57)	<.0001	--	--	--	--	-0.56	0.57	(0.50, 0.65)	<.0001
Economic deprivation (household income under $20,000)	-0.16	0.85	(0.74, 0.98)	.0242	--	--	--	--	-0.21	0.81	(0.68, 0.97)	.0205
Geographic region												
Northeast vs. West	-0.2	0.82	(0.70, 0.96)	.0119	--	--	--	--	-0.14	0.87	(0.72, 1.04)	.1285
North Central vs. West	-0.17	0.84	(0.73, 0.96)	.0127	--	--	--	--	-0.16	0.85	(0.73, 1.00)	.0481
South vs. West	-0.26	0.77	(0.68, 0.88)	.0001	--	--	--	--	-0.17	0.85	(0.73, 0.98)	.0282
County type												
Large MSA vs. non-MSA	0.19	1.21	(1.07, 1.36)	.0023	--	--	--	--	0.20	1.22	(1.06, 1.41)	.0057
Small MSA vs. non-MSA	0.21	1.24	(1.09, 1.41)	.0008	--	--	--	--	0.13	1.14	(0.98, 1.32)	.0925
Family Domain[2]												
Parental monitoring	--	--	--	--	0.77	2.16	(1.96, 2.38)	<.0001	0.50	1.65	(1.49, 1.83)	<.0001
Parental encouragement	--	--	--	--	-0.21	0.81	(0.75, 0.87)	<.0001	-0.21	0.81	(0.75, 0.87)	<.0001
Parental attitudes toward marijuana use	--	--	--	--	0.95	2.57	(2.35, 2.82)	<.0001	0.88	2.42	(2.20, 2.67)	<.0001
Parents communicate about substance use	--	--	--	--	0.45	1.57	(1.39, 1.77)	<.0001	0.40	1.50	(1.32, 1.70)	<.0001
Parents are source of social support	--	--	--	--	-0.67	0.51	(0.45, 0.58)	<.0001	-0.67	0.51	(0.45, 0.58)	<.0001
Sample size	25,357				18,896				18,896			
R^2 (see footnote 3)	0.09				0.10				0.15			
R_N^2 (see footnote 4)	0.15				0.17				0.25			

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

[1] ORs are derived from multiple logistic regression models and adjusted for other variables included in each model. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[2] The questions used to measure each of the factors are provided in Appendix A (Table A.2). The coding and distribution of the responses for each factor are provided in Table 2.2.

[3] Indicates X^2 comparison -2log-likelihood of Model 2 vs. Model 3 is significant.

[3] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1-[L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and n is the sample size.

[4] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.3   Results of Logistic Regression Models Predicting Past Year *Marijuana Use* with Demographics and *Peer/Individual Domain* Risk and Protective Factors among Youths Aged 12 to 17: 1999

	Model 1: Demographics				Model 2: Peer/Individual Risk/Protective Factors				Model 3: Demographics + Peer Individual Risk/Protective Factors			
	β	OR[1]	95% CI	*p* value	β	OR[1]	95% CI	*p* value	β	OR[1]	95% CI	*p* value
Intercept	-9.06	--	--	<.0001	-8.04	--	--	<.0001	-12.37	--	--	<.0001
Demographics												
Race/ethnicity												
Black vs. white	-0.43	0.65	(0.55, 0.78)	<.0001	--	--	--	--	-0.31	0.73	(0.59, 0.91)	.0044
Hispanic vs. white	-0.10	0.90	(0.76, 1.06)	.2155	--	--	--	--	-0.04	0.96	(0.77, 1.19)	.7172
Other vs. white	-0.39	0.67	(0.50, 0.91)	.0095	--	--	--	--	-0.03	0.97	(0.69, 1.38)	.8716
Gender - male vs. female	0.16	1.18	(1.07, 1.29)	.0008	--	--	--	--	-0.24	0.79	(0.69, 0.90)	.0003
Age (continuous - 12 to 17)	0.52	1.68	(1.63, 1.72)	<.0001	--	--	--	--	0.31	1.36	(1.30, 1.43)	<.0001
Number of parents in home (2 vs. others)	-0.67	0.51	(0.46, 0.57)	<.0001	--	--	--	--	-0.37	0.69	(0.60, 0.79)	<.0001
Economic deprivation (household income under $20,000)	-0.16	0.85	(0.74, 0.98)	.0242	--	--	--	--	-0.24	0.79	(0.65, 0.95)	.0115
Geographic region												
Northeast vs. West	-0.20	0.82	(0.70, 0.96)	.0119	--	--	--	--	-0.24	0.78	(0.63, 0.98)	.0315
North Central vs. West	-0.17	0.84	(0.73, 0.96)	.0127	--	--	--	--	-0.02	0.98	(0.81, 1.17)	.8103
South vs. West	-0.26	0.77	(0.68, 0.88)	.0001	--	--	--	--	-0.07	0.94	(0.78, 1.12)	.4642
County type					--	--	--	--				
Large MSA vs. non-MSA	0.19	1.21	(1.07, 1.36)	.0023	--	--	--	--	0.09	1.09	(0.93, 1.27)	.2792
Small MSA vs. non-MSA	0.21	1.24	(1.09, 1.41)	.0008	--	--	--	--	0.06	1.06	(0.90, 1.24)	.4840
Peer/Individual Domain[2]												
Antisocial behavior	--	--	--	--	0.60	1.82	(1.50, 2.21)	<.0001	0.82	2.26	(1.83, 2.80)	<.0001
Individual attitudes toward marijuana use	--	--	--	--	0.58	1.79	(1.63, 1.97)	<.0001	0.56	1.74	(1.58, 1.92)	<.0001
Friends' attitudes toward marijuana use	--	--	--	--	0.38	1.46	(1.34, 1.59)	<.0001	0.35	1.42	(1.31, 1.55)	<.0001
Friends' marijuana use	--	--	--	--	1.15	3.17	(2.90, 3.46)	<.0001	1.03	2.79	(2.55, 3.06)	<.0001
Perceived risk of marijuana use	--	--	--	--	0.55	1.74	(1.61, 1.88)	<.0001	0.54	1.72	(1.59, 1.86)	<.0001
Risk-taking proclivity	--	--	--	--	0.29	1.34	(1.22, 1.47)	<.0001	0.33	1.38	(1.25, 1.53)	<.0001
Participation in two or more extracurricular activities	--	--	--	--	-0.09	0.91	(0.80, 1.04)	.1773	-0.08	0.92	(0.81, 1.05)	.2384
Religiosity	--	--	--	--	-0.11	0.9	(0.82, 0.98)	.0149	-0.06	0.95	(0.87, 1.04)	.2279
Sample size		25,357				23,487				23,487		
R[2] (see footnote 3)		0.09				0.29				0.30		
R_N^2 (see footnote 4)		0.15				0.51				0.53		

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

[1] ORs are derived from multiple logistic regression models and adjusted for other variables included in each model. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[2] The questions used to measure each of the factors are provided in Appendix A (Table A.3). The coding and distribution of the responses for each factor are provided in Table 2.3.

[3] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1 - [L(O) / L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and *n* is the sample size.

[4] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.4   Results of Logistic Regression Models Predicting Past Year *Marijuana Use* with Demographics and *School Domain* Risk and Protective Factors among Youths Aged 12 to 17: 1999

	Model 1: Demographics				Model 2: School Risk/Protective Factors				Model 3: Demographics + School Risk/Protective Factors			
	β	OR[1]	95% CI	*p* value	β	OR[1]	95% CI	*p* value	β	OR[1]	95% CI	*p* value
Intercept	-9.06	--	--	<.0001	-3.93	--	--	<.0001	-8.46	--	--	<.0001
Demographics												
Race/ethnicity												
Black vs. white	-0.43	0.65	(0.55, 0.78)	<.0001	--	--	--	--	-0.66	0.52	(0.41, 0.65)	<.0001
Hispanic vs. white	-0.10	0.90	(0.76, 1.06)	.2155	--	--	--	--	-0.05	0.95	(0.78, 1.16)	.6092
Other vs. white	-0.39	0.67	(0.50, 0.91)	.0095	--	--	--	--	-0.16	0.85	(0.60, 1.21)	.3656
Gender - male vs. female	0.16	1.18	(1.07, 1.29)	.0008	--	--	--	--	0.11	1.12	(0.99, 1.26)	.0695
Age (continuous - 12 to 17)	0.52	1.68	(1.63, 1.72)	<.0001	--	--	--	--	0.34	1.41	(1.35, 1.47)	<.0001
Number of parents in home (2 vs. others)	-0.67	0.51	(0.46, 0.57)	<.0001	--	--	--	--	-0.55	0.57	(0.50, 0.66)	<.0001
Economic deprivation (household income under $20,000)	-0.16	0.85	(0.74, 0.98)	.0242	--	--	--	--	-0.11	0.90	(0.75, 1.07)	.2349
Geographic region												
Northeast vs. West	-0.20	0.82	(0.70, 0.96)	.0119	--	--	--	--	-0.20	0.82	(0.67, 0.99)	.0371
North Central vs. West	-0.17	0.84	(0.73, 0.96)	.0127	--	--	--	--	-0.15	0.86	(0.73, 1.02)	.0757
South vs. West	-0.26	0.77	(0.68, 0.88)	.0001	--	--	--	--	-0.18	0.84	(0.71, 0.99)	.0323
County type												
Large MSA vs. non-MSA	0.19	1.21	(1.07, 1.36)	.0023	--	--	--	--	0.12	1.13	(0.98, 1.31)	.1039
Small MSA vs. non-MSA	0.21	1.24	(1.09, 1.41)	.0008	--	--	--	--	0.02	1.03	(0.88, 1.20)	.7517
School Domain[2]												
Commitment to school	--	--	--	--	-0.39	0.68	(0.62, 0.74)	<.0001	-0.37	0.69	(0.63, 0.76)	<.0001
Sanctions against marijuana use at school	--	--	--	--	-0.11	0.89	(0.75, 1.07)	.2087	-0.11	0.90	(0.75, 1.07)	.2255
Perceived prevalence of marijuana use	--	--	--	--	1.43	4.17	(3.82, 4.55)	<.0001	1.26	3.52	(3.20, 3.87)	<.0001
Academic performance	--	--	--	--	0.32	1.38	(1.29, 1.48)	<.0001	0.33	1.39	(1.30, 1.50)	<.0001
Exposed to prevention messages in school	--	--	--	--	-0.23	0.79	(0.69, 0.90)	.0006	-0.14	0.87	(0.76, 1.00)	.0511
Sample size		25,357				17,679				17,679		
R^2 (see footnote 3)		0.09				0.16				0.18		
R_N^2 (see footnote 4)		0.15				0.27				0.32		

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

[1] ORs are derived from multiple logistic regression models and adjusted for other variables included in each model. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[2] The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.

[3] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1 - [L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and n is the sample size.

[4] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.5 **Odds Ratios and 95 Percent Confidence Intervals of *Combined Reduced Model* of Demographics and Risk and Protective Factors Predicting Past Year *Marijuana Use* among Youths Aged 12 to 17: 1999**

	β	OR[1]	95% CI	*p* value
Intercept	-14.85	--	--	<.0001
Demographics				
Race/ethnicity				
Black vs. white	-0.56	0.57	(0.44, 0.74)	<.0001
Hispanic vs. white	-0.01	0.99	(0.77, 1.28)	.9264
Other vs. white	0.01	1.01	(0.65, 1.58)	.9619
Gender - male vs. female	-0.15	0.86	(0.74, 1.00)	.0494
Age (continuous - 12 to 17)	0.25	1.29	(1.22, 1.36)	<.0001
Number of parents in home (2 vs. others)	-0.28	0.76	(0.64, 0.90)	.0017
Economic deprivation (household income under $20,000)	-0.21	0.81	(0.65, 1.02)	.0762
Geographic region				
Northeast vs. West	-0.18	0.83	(0.65, 1.06)	.1377
North Central vs. West	-0.01	0.99	(0.80, 1.23)	.9084
South vs. West	0.02	1.03	(0.83, 1.27)	.8171
County type				
Large MSA vs. non-MSA	0.15	1.16	(0.96, 1.40)	.1274
Small MSA vs. non-MSA	0.00	1.00	(0.82, 1.22)	.9836
Community Domain[2]				
Community attitudes toward marijuana use	-0.13	0.88	(0.79, 0.99)	.0285
Community norms toward marijuana use	0.35	1.42	(1.25, 1.60)	<.0001
Availability of marijuana	0.25	1.28	(1.18, 1.39)	.0001
Exposed to prevention messages in the media	-0.21	0.81	(0.67, 0.99)	.0434
Family Domain[2]				
Parental monitoring	0.10	1.11	(0.97, 1.26)	.1345
Parental encouragement	-0.02	0.98	(0.88, 1.09)	.7285
Parental attitudes toward marijuana use	0.17	1.19	(1.03, 1.38)	.0197
Parents communicate about substance use	0.47	1.59	(1.35, 1.88)	<.0001
Parents are source of social support	-0.32	0.73	(0.62, 0.85)	.0001
Peer/Individual Domain[2]				
Antisocial behavior	0.75	2.11	(1.63, 2.73)	<.0001
Individual attitudes toward marijuana use	0.54	1.71	(1.53, 1.91)	.0001
Friends' attitudes toward marijuana use	0.34	1.40	(1.26, 1.55)	<.0001
Friends' marijuana use	0.73	2.07	(1.80, 2.37)	<.0001
Perceived risk of marijuana use	0.58	1.78	(1.63, 1.95)	<.0001
Risk-taking proclivity	0.24	1.27	(1.12, 1.44)	.0002
School Domain[2]				
Commitment to school	0.35	1.42	(1.25, 1.61)	<.0001
Perceived prevalence of marijuana use	0.35	1.42	(1.24, 1.62)	<.0001
Academic performance	0.18	1.20	(1.09, 1.32)	.0003
Sample size			16,402	
R^2 (see footnote 3)			0.33	
R_N^2 (see footnote 4)			0.56	

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

[1] ORs are derived from a single multiple logistic regression model that included the set of demographic variables as well as all of the risk and protective factors included in the table. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[2] The questions used to measure each of the factors are provided in Appendix A (Tables A.1 to A.4). The coding and distribution of the responses for each factor are provided in Tables 2.1 to 2.4.

[3] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1-[L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and n is the sample size.

[4] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.6 Odds Ratios and 95 Percent Confidence Intervals of *Final Model* of Demographics and Risk and Protective Factors Predicting Past Year *Marijuana Use* among Youths Aged 12 to 17: 1999

	β	OR[1]	95% CI	*p* value
Intercept	-14.75	--	--	<.0001
Demographics				
Race/ethnicity				
Black vs. white	-0.57	0.57	(0.44, 0.74)	<.0001
Hispanic vs. white	-0.01	0.99	(0.77, 1.28)	.9312
Other vs. white	0.01	1.01	(0.65, 1.58)	.9502
Gender - male vs. female	-0.16	0.85	(0.73, 0.99)	.0405
Age (continuous - 12 to 17)	0.26	1.30	(1.22, 1.37)	<.0001
Number of parents in home (2 vs. others)	-0.28	0.75	(0.64, 0.90)	.0014
Economic deprivation (household income under $20,000)	-0.21	0.81	(0.65, 1.02)	.0749
Geographic region				
Northeast vs. West	-0.18	0.84	(0.66, 1.07)	.1517
North Central vs. West	-0.01	0.99	(0.80, 1.23)	.9575
South vs. West	0.03	1.03	(0.84, 1.27)	.7656
County type				
Large MSA vs. non-MSA	0.15	1.16	(0.96, 1.40)	.1263
Small MSA vs. non-MSA	0.00	1.00	(0.82, 1.21)	.9725
Community Domain[2]				
Community attitudes toward marijuana use	-0.12	0.88	(0.79, 0.99)	.0323
Community norms toward marijuana use	0.35	1.42	(1.25, 1.61)	<.0001
Availability of marijuana	0.25	1.28	(1.18, 1.40)	<.0001
Exposed to prevention messages in the media	-0.21	0.81	(0.66, 0.99)	.0423
Family Domain[2]				
Parental attitudes toward marijuana use	0.18	1.19	(1.03, 1.38)	.0186
Parents communicate about substance use	0.44	1.55	(1.32, 1.82)	<.0001
Parents are source of social support	-0.34	0.71	(0.61, 0.83)	<.0001
Peer/Individual Domain[2]				
Antisocial behavior	0.76	2.13	(1.65, 2.75)	<.0001
Individual attitudes toward marijuana use	0.54	1.71	(1.53, 1.91)	<.0001
Friends' attitudes toward marijuana use	0.34	1.40	(1.26, 1.56)	<.0001
Friends' marijuana use	0.73	2.07	(1.81, 2.38)	<.0001
Perceived risk of marijuana use	0.58	1.79	(1.64, 1.95)	<.0001
Risk-taking proclivity	0.24	1.27	(1.12, 1.44)	.0002
School Domain[2]				
Commitment to school	0.33	1.39	(1.22, 1.58)	<.0001
Perceived prevalence of marijuana use	0.35	1.42	(1.25, 1.63)	<.0001
Academic performance	0.18	1.20	(1.09, 1.32)	.0004
Sample size		16,411		
R^2 (see footnote 3)		0.33		
R_N^2 (see footnote 4)		0.56		

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

[1] ORs are derived from a single multiple logistic regression model that included the set of demographic variables as well as all of the risk and protective factors included in the table. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[2] The questions used to measure each of the factors are provided in Appendix A (Tables A.1 to A.4). The coding and distribution of the responses for each factor are provided in Tables 2.1 to 2.4.

[3] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1-[L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and *n* is the sample size.

[4] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.7 Results of Logistic Regression Models Predicting Past Year *Cigarette Use* with *Demographics* and Risk and Protective Factors, by Domain, among Youths Aged 12 to 17: 1999

	Demographics[1] + Risk/Protective Factors[2]			
	β	OR[3]	95% CI	*p* value
Community Domain[2] + Demographics[1]				
Community disorganization and crime	0.05	1.05	(0.98, 1.13)	.1439
Neighborhood cohesiveness	0.01	1.01	(0.95, 1.07)	.7155
Community attitudes toward cigarette use	0.39	1.47	(1.40, 1.56)	<.0001
Community norms toward cigarette use	0.70	2.00	(1.87, 2.14)	<.0001
Exposed to prevention messages in the media	-0.22	0.80	(0.72, 0.89)	.0001
Family Domain[2] + Demographics[1]				
Parental monitoring	0.37	1.45	(1.32, 1.60)	<.0001
Parental encouragement	-0.19	0.83	(0.77, 0.89)	<.0001
Parental attitudes toward cigarette use	0.76	2.14	(1.96, 2.34)	<.0001
Parents communicate about substance use	0.30	1.34	(1.22, 1.48)	<.0001
Parents are source of social support	-0.76	0.47	(0.42, 0.52)	<.0001
Peer/Individual Domain[2] + Demographics[1]				
Antisocial behavior	0.68	1.97	(1.66, 2.34)	<.0001
Individual attitudes toward cigarette use	0.45	1.56	(1.47, 1.67)	<.0001
Friends' attitudes toward cigarette use	0.21	1.24	(1.16, 1.32)	<.0001
Friends' cigarette use	0.92	2.52	(2.34, 2.71)	<.0001
Perceived risk of cigarette use	0.18	1.19	(1.12, 1.27)	<.0001
Risk-taking proclivity	0.46	1.59	(1.47, 1.71)	<.0001
Participation in two or more extracurricular activities	-0.17	0.85	(0.76, 0.94)	.0015
Religiosity	-0.17	0.85	(0.79, 0.91)	<.0001
School Domain[2] + Demographics[1]				
Commitment to school	-0.42	0.65	(0.60, 0.71)	<.0001
Sanctions against cigarette use at school	-0.23	0.79	(0.73, 0.86)	<.0001
Perceived prevalence of cigarette use	0.74	2.10	(1.93, 2.29)	<.0001
Academic performance	0.41	1.51	(1.43, 1.60)	<.0001
Exposed to prevention messages in school	-0.12	0.88	(0.78, 1.00)	.0542

OR = odds ratio; CI = confidence interval.

Note: No question was asked about availability of cigarettes.

[1] Demographic variables included in models were race/ethnicity, gender, age, number of parents in home, household income, geographic region, and county type.

[2] The questions used to measure each of the factors are provided in Appendix A (Tables A.1 to A.4). The coding and distribution of the responses for each factor are provided in Tables 2.1 to 2.4.

[3] ORs are derived from multiple logistic regression models, run separately for each domain, and adjusted for the demographic variables as well as the other factors within each domain. ORs > 1.0 indicate that the odds of past year cigarette use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of cigarette use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against cigarette use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.8 Results of Logistic Regression *Combined Reduced Model* Predicting Past Year *Cigarette Use* with Demographics and Risk and Protective Factors among Youths Aged 12 to 17: 1999

	β	OR[1]	95% CI	*p* value
Intercept	-9.90	--	--	<.0001
Demographics				
Race/ethnicity				
Black vs. white	-0.57	0.56	(0.46, 0.69)	<.0001
Hispanic vs. white	-0.30	0.74	(0.61, 0.90)	.0021
Other vs. white	-0.22	0.80	(0.59, 1.09)	.1594
Gender - male vs. female	-0.26	0.77	(0.68, 0.87)	<.0001
Age (continuous - 12 to 17)	0.25	1.29	(1.24, 1.34)	<.0001
Number of parents in home (2 vs. others)	-0.24	0.79	(0.69, 0.90)	.0003
Economic deprivation (household income under $20,000)	-0.22	0.80	(0.68, 0.95)	.0119
Geographic region				
Northeast vs. West	-0.11	0.89	(0.73, 1.10)	.2918
North Central vs. West	0.00	1.00	(0.84, 1.18)	.9626
South vs. West	0.09	1.09	(0.93, 1.29)	.2910
County type				
Large MSA vs. non-MSA	-0.10	0.90	(0.78, 1.04)	.1612
Small MSA vs. non-MSA	-0.01	0.99	(0.85, 1.15)	.8923
Community Domain[2]				
Community attitudes toward cigarette use	0.03	1.03	(0.95, 1.11)	.4500
Community norms toward cigarette use	0.11	1.12	(1.02, 1.23)	.0161
Exposed to prevention messages in the media	-0.02	0.98	(0.85, 1.13)	.7816
Family Domain[2]				
Parental monitoring	0.09	1.10	(0.97, 1.23)	.1290
Parental encouragement	-0.01	0.99	(0.91, 1.08)	.8356
Parental attitudes toward cigarette use	0.25	1.29	(1.16, 1.43)	<.0001
Parents communicate about substance use	0.38	1.46	(1.30, 1.64)	<.0001
Parents are source of social support	-0.49	0.62	(0.54, 0.70)	<.0001
Peer/Individual Domain[2]				
Antisocial behavior	0.53	1.69	(1.39, 2.06)	<.0001
Individual attitudes toward cigarette use	0.46	1.58	(1.46, 1.70)	<.0001
Friends' attitudes toward cigarette use	0.13	1.14	(1.05, 1.24)	.0015
Friends' cigarette use	0.82	2.28	(2.08, 2.49)	<.0001
Perceived risk of cigarette use	0.17	1.18	(1.09, 1.28)	<.0001
Risk-taking proclivity	0.39	1.48	(1.34, 1.63)	<.0001
Participation in two or more extracurricular activities	-0.11	0.90	(0.78, 1.03)	.1298
Religiosity	-0.17	0.85	(0.78, 0.92)	.0001
School Domain[2]				
Commitment to school	0.03	1.03	(0.93, 1.14)	.5952
Sanctions against cigarette use at school	0.01	1.01	(0.92, 1.11)	.8681
Perceived prevalence of cigarette use	0.16	1.17	(1.06, 1.31)	.0029
Academic performance	0.17	1.19	(1.11, 1.28)	<.0001

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

Note: No question was asked about availability of cigarettes.

[1] ORs are derived from a single multiple logistic regression model that included the set of demographic variables as well as all of the risk and protective factors included in the table. ORs > 1.0 indicate that the odds of past year cigarette use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of cigarette use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against cigarette use.

[2] The questions used to measure each of the factors are provided in Appendix A (Tables A.1 to A.4). The coding and distribution of the responses for each factor are provided in Tables 2.1 to 2.4.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.9   Results of Logistic Regression *Final Model* Predicting Past Year *Cigarette Use* with Demographics and Risk and Protective Factors among Youths Aged 12 to 17: 1999

	β	OR[1]	95% CI	*p* value
Intercept	-9.81	--	--	<.0001
Demographics				
Race/ethnicity				
Black vs. white	-0.58	0.56	(0.46, 0.68)	<.0001
Hispanic vs. white	-0.25	0.78	(0.64, 0.94)	.0079
Other vs. white	-0.25	0.78	(0.58, 1.05)	.1031
Gender - male vs. female	-0.26	0.77	(0.68, 0.87)	<.0001
Age (continuous - 12 to 17)	0.26	1.30	(1.25, 1.35)	<.0001
Number of parents in home (2 vs. others)	-0.25	0.78	(0.68, 0.88)	.0001
Economic deprivation (household income under $20,000)	-0.22	0.80	(0.68, 0.95)	.0115
Geographic region				
Northeast vs. West	-0.12	0.89	(0.72, 1.09)	.2506
North Central vs. West	-0.02	0.98	(0.84, 1.16)	.8539
South vs. West	0.09	1.09	(0.93, 1.28)	.2826
County type				
Large MSA vs. non-MSA	-0.11	0.90	(0.78, 1.03)	.1316
Small MSA vs. non-MSA	-0.02	0.98	(0.85, 1.14)	.8305
Community Domain[2]				
Community's norms toward cigarette use	0.13	1.14	(1.04, 1.25)	.0052
Family Domain[2]				
Parental attitudes toward cigarette use	0.28	1.32	(1.19, 1.46)	<.0001
Parents communicate about substance use	0.36	1.43	(1.29, 1.60)	<.0001
Parents are source of social support	-0.50	0.61	(0.54, 0.69)	<.0001
Peer/Individual Domain[2]				
Antisocial behavior	0.55	1.72	(1.42, 2.09)	<.0001
Individual attitudes toward cigarette use	0.45	1.57	(1.46, 1.70)	<.0001
Friends' attitudes toward cigarette use	0.15	1.16	(1.07, 1.26)	.0003
Friends' cigarette use	0.82	2.28	(2.09, 2.49)	<.0001
Perceived risk of cigarette use	0.17	1.18	(1.09, 1.28)	<.0001
Risk-taking proclivity	0.38	1.46	(1.33, 1.60)	<.0001
Religiosity	-0.19	0.83	(0.77, 0.90)	<.0001
School Domain[2]				
Perceived prevalence of cigarette use	0.15	1.17	(1.05, 1.29)	.0035
Academic performance	0.18	1.20	(1.12, 1.28)	<.0001
Sample size			17,410	
R^2 (see footnote 3)			0.29	
R_N^2 (see footnote 4)			0.43	

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

Note: No question was asked about availability of cigarettes.

[1] ORs are derived from a single multiple logistic regression model that included the set of demographic variables as well as all of the risk and protective factors included in the table. ORs > 1.0 indicate that the odds of past year cigarette use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of cigarette use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against cigarette use.

[2] The questions used to measure each of the factors are provided in Appendix A (Tables A.1 to A.4). The coding and distribution of the responses for each factor are provided in Tables 2.1 to 2.4.

[3] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1 - [L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and n is the sample size.

[4] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.10   Results of Logistic Regression Models Predicting Past Year *Alcohol Use* with *Demographics* and Risk and Protective Factors, by Domain, among Youths Aged 12 to 17: 1999

	Demographics[1] + Risk/Protective Factors[2]			
	β	**OR[3]**	**95% CI**	***p* value**
Community Domain[2] + Demographics[1]				
Community disorganization and crime	-0.05	0.95	(0.89, 1.02)	.1610
Neighborhood cohesiveness	0.01	1.01	(0.96, 1.07)	.6212
Community attitudes toward alcohol use	0.27	1.31	(1.24, 1.39)	<.0001
Community norms toward alcohol use	0.92	2.51	(2.35, 2.68)	<.0001
Exposed to prevention messages in the media	-0.07	0.93	(0.84, 1.02)	.1336
Family Domain[2] + Demographics[1]				
Parental monitoring	0.49	1.64	(1.51, 1.77)	<.0001
Parental encouragement	-0.13	0.88	(0.82, 0.93)	<.0001
Parental attitudes toward alcohol use	0.65	1.91	(1.73, 2.11)	<.0001
Parents communicate about substance use	0.27	1.31	(1.19, 1.44)	<.0001
Parents are source of social support	-0.65	0.52	(0.47, 0.58)	<.0001
Peer/Individual Domain[2] + Demographics[1]				
Antisocial behavior	0.50	1.65	(1.35, 2.01)	<.0001
Individual attitudes toward alcohol use	0.38	1.46	(1.37, 1.57)	<.0001
Friends' attitudes toward alcohol use	0.08	1.08	(1.01, 1.16)	.0310
Friends' alcohol use	0.99	2.69	(2.50, 2.89)	<.0001
Perceived risk of alcohol use	0.19	1.21	(1.14, 1.30)	<.0001
Risk-taking proclivity	0.64	1.89	(1.76, 2.03)	<.0001
Participation in two or more extracurricular activities	0.11	1.12	(1.01, 1.24)	.0292
Religiosity	-0.26	0.77	(0.72, 0.82)	<.0001
School Domain[2] + Demographics[1]				
Commitment to school	-0.46	0.63	(0.58, 0.68)	<.0001
Sanctions against alcohol use at school	0.11	1.11	(0.99, 1.25)	.0676
Perceived prevalence of alcohol use	0.96	2.62	(2.42, 2.83)	<.0001
Academic performance	0.21	1.23	(1.16, 1.30)	<.0001
Exposed to prevention messages in school	-0.03	0.97	(0.87, 1.08)	.5494

Note: No question was asked about availability of alcohol.

[1] Demographic variables included in models were race/ethnicity, gender, age, number of parents in home, household income, geographic region, and county type.

[2] The questions used to measure each of the factors are provided in Appendix A (Tables A.1 to A.4). The coding and distribution of the responses for each factor are provided in Tables 2.1 to 2.4.

[3] ORs are derived from multiple logistic regression models, run separately for each domain, and adjusted for the demographic variables as well as the other factors within each domain. ORs > 1.0 indicate that the odds of past year alcohol use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of alcohol use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against alcohol use.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.11 Results of Logistic Regression *Combined Reduced Model* Predicting Past Year *Alcohol Use* with Demographics and Risk and Protective Factors among Youths Aged 12 to 17: 1999

	β	OR[1]	95% CI	*p* value
Intercept	-10.73	--	--	<.0001
Demographics				
Race/ethnicity				
Black vs. white	-0.63	0.53	(0.44, 0.65)	<.0001
Hispanic vs. white	0.00	1.00	(0.83, 1.22)	.9681
Other vs. white	-0.28	0.75	(0.56, 1.01)	.0567
Gender - male vs. female	-0.41	0.67	(0.60, 0.74)	<.0001
Age (continuous - 12 to 17)	0.36	1.43	(1.38, 1.48)	<.0001
Number of parents in home (2 vs. others)	-0.18	0.83	(0.74, 0.94)	.0021
Economic deprivation (household income under $20,000)	-0.17	0.84	(0.72, 0.99)	.0329
Geographic region				
Northeast vs. West	0.01	1.01	(0.85, 1.20)	.8829
North Central vs. West	-0.06	0.94	(0.81, 1.09)	.4278
South vs. West	-0.03	0.97	(0.83, 1.13)	.6693
County type				
Large MSA vs. non-MSA	0.09	1.09	(0.96, 1.24)	.1935
Small MSA vs. non-MSA	0.08	1.08	(0.95, 1.24)	.2480
Community Domain[2]				
Community attitudes toward alcohol use	-0.06	0.94	(0.87, 1.02)	.1238
Community norms toward alcohol use	0.27	1.31	(1.19, 1.43)	<.0001
Family Domain[2]				
Parental monitoring	0.16	1.17	(1.07, 1.29)	.0012
Parental encouragement	0.03	1.03	(0.96, 1.11)	.4043
Parental attitudes toward alcohol use	0.17	1.18	(1.03, 1.35)	.0139
Parents communicate about substance use	0.26	1.30	(1.17, 1.46)	<.0001
Parents are source of social support	-0.34	0.71	(0.63, 0.80)	<.0001
Peer/Individual Domain[2]				
Antisocial behavior	0.52	1.69	(1.32, 2.16)	<.0001
Individual attitudes toward alcohol use	0.41	1.50	(1.38, 1.63)	<.0001
Friends' attitudes toward alcohol use	-0.01	0.99	(0.91, 1.08)	.8207
Friends' alcohol use	0.85	2.34	(2.12, 2.59)	<.0001
Perceived risk of alcohol use	0.22	1.24	(1.15, 1.35)	<.0001
Risk-taking proclivity	0.59	1.81	(1.65, 1.98)	<.0001
Participation in two or more extracurricular activities	0.04	1.04	(0.92, 1.19)	.5205
Religiosity	-0.24	0.79	(0.73, 0.85)	<.0001
School Domain[2]				
Commitment to school	0.07	1.07	(0.97, 1.18)	.1598
Perceived prevalence of alcohol use	0.13	1.14	(1.03, 1.27)	.0118
Academic performance	0.03	1.03	(0.97, 1.11)	.3341

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

Note: No question was asked about availability of alcohol.

[1] ORs are derived from a single multiple logistic regression model that included the set of demographic variables as well as all of the risk and protective factors included in the table. ORs > 1.0 indicate that the odds of past year alcohol use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of alcohol use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against alcohol use.

[2] The questions used to measure each of the factors are provided in Appendix A (Tables A.1 to A.4). The coding and distribution of the responses for each factor are provided in Tables 2.1 to 2.4.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table 4.12 Results of Logistic Regression *Final Model* Predicting Past Year *Alcohol Use* with Demographics and Risk and Protective Factors among Youths Aged 12 to 17: 1999

	β	OR[1]	95% CI	*p* value
Intercept	-10.06	--	--	<.0001
Demographics				
Race/ethnicity				
Black vs. white	-0.61	0.54	(0.45, 0.66)	<.0001
Hispanic vs. white	0.01	1.01	(0.84, 1.21)	.9453
Other vs. white	-0.28	0.76	(0.57, 1.01)	.0580
Gender - male vs. female	-0.40	0.67	(0.61, 0.75)	<.0001
Age (continuous - 12 to 17)	0.35	1.41	(1.36, 1.47)	<.0001
Number of parents in home (2 vs. others)	-0.20	0.82	(0.73, 0.92)	.0007
Economic deprivation (household income under $20,000)	-0.18	0.83	(0.71, 0.97)	.0203
Geographic region				
Northeast vs. West	0.02	1.02	(0.86, 1.21)	.8179
North Central vs. West	-0.06	0.94	(0.81, 1.09)	.4085
South vs. West	-0.03	0.97	(0.83, 1.13)	.7133
County type				
Large MSA vs. non-MSA	0.06	1.06	(0.93, 1.21)	.3661
Small MSA vs. non-MSA	0.05	1.05	(0.92, 1.20)	.4733
Community Domain[2]				
Community norms toward alcohol use	0.27	1.31	(1.20, 1.43)	<.0001
Family Domain[2]				
Parental monitoring	0.13	1.14	(1.04, 1.25)	.0038
Parental attitudes toward alcohol use	0.16	1.17	(1.04, 1.33)	.0114
Parents communicate about substance use	0.26	1.30	(1.17, 1.45)	<.0001
Parents are source of social support	-0.33	0.72	(0.64, 0.81)	<.0001
Peer/Individual Domain[2]				
Antisocial behavior	0.48	1.61	(1.29, 2.03)	<.0001
Individual attitudes toward alcohol use	0.39	1.48	(1.38, 1.58)	<.0001
Friends' alcohol use	0.84	2.31	(2.09, 2.54)	<.0001
Perceived risk of alcohol use	0.21	1.24	(1.14, 1.33)	<.0001
Risk-taking proclivity	0.56	1.75	(1.60, 1.90)	<.0001
Religiosity	-0.24	0.79	(0.73, 0.85)	<.0001
School Domain[2]				
Perceived prevalence of alcohol use	0.16	1.17	(1.06, 1.29)	.0020
Sample size		17,265		
R^2 (see footnote 3)		0.34		
R_N^2 (see footnote 4)		0.46		

OR = odds ratio; CI = confidence interval; MSA = metropolitan statistical area.

Note: No question was asked about availability of alcohol.

[1] ORs are derived from a single multiple logistic regression model that included the set of demographic variables as well as all of the risk and protective factors included in the table. ORs > 1.0 indicate that the odds of past year alcohol use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of alcohol use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against alcohol use.

[2] The questions used to measure each of the factors are provided in Appendix A (Tables A.1 to A.4). The coding and distribution of the responses for each factor are provided in Tables 2.1 to 2.4.

[3] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1 - [L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and *n* is the sample size.

[4] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Chapter 5. Changes in Risk and Protective Factors Between 1997 and 1999

5.1   Introduction

The focus of the previous chapters was on the results of the 1999 National Household Survey on Drug Abuse (NHSDA), which included questions addressing an expanded set of risk and protective factors and an expanded sample relative to previous years of the survey. The discussion updated and extended a previous report on risk and protective factors based upon the 1997 NHSDA (Lane et al., 2001). The focus of this chapter is on changes in the risk and protective factors between 1997 and 1999 and how these changes may be related to observed changes in the prevalence of past year marijuana use among youths during this time period. This chapter addresses the following issues:

- comparison of the estimates of marijuana use between the 1997 and 1999 NHSDAs;

- changes in the distribution of comparable risk and protective factors between 1997 and 1999;

- changes in the associations between the individual risk and protective factors and past year marijuana use between 1997 and 1999;

- comparison of the amount of variation in past year marijuana use explained by the comparable sets of risk and protective factors in 1997 and 1999; and

- discussion of whether the decrease in past year marijuana use among youths between 1997 and 1999 was associated more closely with changes in the distributions of the risk and protective factors or changes in the associations between these factors and past year marijuana use.

A question might be asked, "What is to be gained by determining the extent to which, if any, the reported prevalence of risk and protective factors has changed over time?" Prevention researchers have concluded that a number of risk and protective factors are mediating variables in changes in the usage of substances among youths. The changes in youth substance use over time have been conjectured by various researchers to be attributable to different sets of risk and protective factors (Bachman, Johnston, & O'Malley, 1998). Such factors as the perceived risk of a substance have been shown to be highly (negatively) correlated at the national level with levels of youth substance use; however, substance use and perceived risk do not always move in opposite directions. For example, past month use of marijuana among youths decreased between 1997 and 1999 (9.4 percent in 1997, 8.3 percent in 1998, and 7.0 percent in 1999), but perceived

(great) risk of using marijuana once a month also decreased during the same period (32.6 percent in 1996, 30.9 percent in 1997, 30.8 percent in 1998, and 29.0 percent in 1999). So, it is clear that trends in prevalence are not always directly related to changes in a single risk factor. The relationship may be further complicated by a lagged relationship between changes in risk factors and changes in prevalence rates. Therefore, it is informative to know whether changes in the prevalence of youth substance use are accompanied by a general shift of the risk and protective factors in a given direction. It also is informative to know which risk and protective factors experience the greatest amount of change over time.

In addition, the final model of past year marijuana use in Chapter 4 (Table 4.6) suggests that a large amount of variation is unexplained by the risk and protective factors included in the 1999 NHSDA. Perhaps other variables need to be included in the model to obtain a better fit of the data. An implication of this is that these other variables may better explain the trends. A related question about change in risk and protective factors over time is whether the strength of the associations between (some) factors and youth substance use may change over time, due to changing perspectives and behaviors of the population. If this is the case, some factors may not be as predictive of youth substance use in 1999 as they were in 1997, whereas other factors may be more predictive. If those variables that have changed substantially and are significantly associated with the trends in substance use can be identified, they would represent plausible variables to focus on in the design of programs to reduce substance use among youths.

5.2   Comparison of Estimates of Marijuana Use for 1997 and 1999

Exhibit 5.1 displays estimates of marijuana use for the past month and past year from the 1997 NHSDA as well as estimates from the various versions of the survey from 1999. The 1997 paper-and-pencil interviewing (PAPI) estimates are not comparable with the 1999 CAI estimates because of differences in data collection methodology, and they are not comparable with the 1999 PAPI estimates because of significant differences found in the field interviewer (FI) experience levels between those 2 years. These issues are discussed in detail elsewhere (Gfroerer, Eyerman, & Chromy, 2002).[27] For this reason, the most valid comparison with the prevalence rates from 1997 is made using the 1999 PAPI after adjusting for FI experience.

Looking at the FI-adjusted 1999 PAPI estimates, it is clear that the youth prevalence rates declined between 1997 and 1999 for both past month and past year use of marijuana. Unless noted otherwise, all references to the 1999 NHSDA in this chapter refer to the 1999 PAPI with the FI adjustment. More information about the methodological differences between the 1997 and 1999 NHSDAs, as well as the adjustments made for FI experience, is presented in Appendix D.

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[27] In Gfroerer et al. (2002), specifically see Chapter 7 (Chromy, Davis, Packer, & Gfroerer, 2002) and Chapter 8 (Hughes, Chromy, Giacoletti, & Odom, 2002).

Exhibit 5.1 **Sample Sizes and Percentages Reporting Past Month and Past Year Marijuana Use among Youths Aged 12 to 17 in the 1999 NHSDA PAPI, 1999 NHSDA CAI, 1999 NHSDA PAPI, and 1999 NHSDA PAPI Adjusted for Field Interviewer Experience**

Year and Data Collection Mode of Survey[1]	Sample Size	Percent Used Marijuana in Past Month (Standard Error)	Percent Used Marijuana in Past Year (Standard Error)
1997 NHSDA PAPI	7,844	9.4 (0.56)	15.8 (0.74)
1999 NHSDA CAI	25,357	7.2 (0.20)	14.2 (0.29)
1999 NHSDA PAPI	3,449	8.1 (0.64)	14.7 (0.90)
1999 NHSDA PAPI (FI adjusted)[2]	3,449	7.0 (0.66)	13.0 (0.97)

[1] PAPI = paper-and-pencil interviewing method; CAI = computer-assisted interviewing method.
[2] Adjusted for differences in experience between field interviewers.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

5.3 Risk and Protective Factors Common to Both the 1997 and 1999 NHSDAs

The assessment of change in the prevalence and influence of risk and protective factors between the 1999 and 1997 NHSDAs can be made only between comparable questions in both years of the survey.[28] Of the 60 items used to measure risk and protective factors in the 1999 NHSDA, only 11 were identical to the questions asked in the 1997 survey. These 11 comparable questions were as follows:

Community Domain
1. the ease of availability of marijuana to the youth
2. whether the youth had been approached by a drug seller in the past 30 days

Family Domain
3. parents as a source of social support for the youth

Peer/Individual Domain
4. perception of risk from using marijuana once a month
5. perception of risk from using marijuana once or twice a week
6. how often youths get a kick out of doing things a little dangerous

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[28] Several questions had their wording or response options altered in the 1999 survey in order to improve them. The principal reasons for these changes were that (a) respondents had expressed difficulty in comprehending the meaning of the questions or (b) statistical properties, such as a lack of discrimination between response options, or correlations with other items in the same construct were either excessively high (indicating redundancy) or low (indicating a lack of reliability).

7. how often youths test themselves by doing something a little risky
8. how often youths wear a seatbelt when riding in the front seat of a car
9. the importance of religious beliefs to youths
10. the degree to which religious beliefs influence the youths' decisions
11. how important it is that youths' friends share their religious beliefs

These 11 questions are the focus of the presented comparisons between the 1997 and 1999 NHSDAs. Note that no questions from the school domain were comparable between 1997 and 1999. The distributions for these 11 questions in both 1997 and 1999 are presented in Table 5.1. (For the exact wording and format of these questions, see Appendix A.) Table 5.1 also contains the distributions for some of the demographic items that were measured using identical items in 1997 and 1999.

In addition to these 11 items, a small number of questions measured similar constructs but were asked using slightly different questions between the 1997 and 1999 surveys. One example is the question about use of marijuana by friends:

- *1997 question and response options*: How many of your close friends have tried marijuana once or twice? (1) none of them, (2) a few of them, or (3) most of them.

- *1999 question and response options*: How many of your friends would you say use marijuana or hashish? (1) none of them, (2) a few of them, (3) most of them, or (4) all of them.

Here, one can see changes in both the question and in the answer options. The 1997 question talks about close friends trying marijuana, which implies occasional use. The 1999 question talks about a broader group of friends (not just close friends) using marijuana or hashish, which implies a more regular usage. In addition, the 1999 question has a response option of "all of them" that was not present in 1997. Because of these types of changes, it is not possible to tell whether differences in the distribution of friends' use of marijuana between 1997 and 1999 were due to actual differences in youths' perceptions of marijuana use among their friends or to changes in the wording of the questions. For this reason, questions that were similar but not identical in the 1997 and 1999 surveys were not included in the comparisons presented in this chapter. A more complete discussion of the questions that were asked using similar but not identical questions in the 1997 and 1999 surveys is presented in Appendix E. Selected analyses also are presented.

5.4   Comparison of Risk and Protective Factors Between 1997 and 1999

For the 11 comparable questions between 1997 and 1999, two dimensions of comparison across the 2 years are especially relevant: the distribution of answers among the response

categories, and the strength of the association of the responses with substance use (here, the past year use of marijuana). The purpose of the first comparison is to show whether there were significant changes in the percentage of youths indicating they had the risk or protective factor (i.e., changes in answers that youths gave to the questions related to risk and protective factors) between 1997 and 1999. The second comparison's purpose is to show whether the associations between each of the comparable risk and protective questions and past year marijuana use were stronger or weaker in 1999 compared with 1997.

5.4.1 Distributions of Factors Between 1997 and 1999

Table 5.1 presents, for the comparable questions, percentages of youths who selected each response category in both 1997 and 1999, as well as a test of whether the differences in responses between the 2 years are statistically significant (values of $p < .05$). The table also includes comparisons of the distributions of a set of demographic variables. Note that there were no statistically significant differences in the age, gender, or race/ethnicity distributions of youths over the 2-year period.

It is clear from Table 5.1 that there were a number of statistically significant differences in the distributions of these variables between 1997 and 1999. However, except for cases in which there were only two categories (e.g., whether the youth was approached by someone selling drugs), it is difficult to determine from Table 5.1 whether the 1999 distribution of a factor indicates a higher or lower level of risk (or protection) than in 1997. Because the goal is to determine whether the decrease in youth marijuana use can be associated with a corresponding decrease in the prevalence of risk factors or a decrease in the strength of the association between risk factors and youth marijuana use, it is important to be able to describe the "direction" of the associated changes. For this purpose, the categories of each of the 11 common risk and protective factors have been collapsed into two categories. These results are presented in Table 5.2.

These findings indicate that none of the questions related to risk and protective factors that were directly comparable between the 1997 and 1999 NHSDAs showed statistically significant change in prevalence between the 2 years. If one looks at the direction of the changes in these factors between 1997 and 1999 (discounting statistical significance), Table 5.2 indicates that about half of the 11 variables changed in the direction of decreased risk of substance use (e.g., compared with 1997, youths in 1999 were more likely to report that marijuana was difficult to obtain and less likely to have been approached by a drug seller in the past 30 days), and the remaining questions changed in the direction of increased risk of substance use (e.g., compared with 1997, youths in 1999 were less likely to talk to their parents about a serious problem and were less likely to perceive a great risk from using marijuana).

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5.4.2 Associations with Marijuana Use in 1997 and 1999

Table 5.3 presents the associations with past year marijuana use of the dichotomized risk and protective factors that were measured using comparable items in 1997 and 1999, as well as a test of whether the difference in associations between the 2 years was statistically significant. As was the case with the distributions seen in Table 5.1, the associations between all three demographic variables and past year marijuana use indicate no significant changes between 1997 and 1999. This lack of change can also be seen in the similar betas and odds ratios (ORs) for most of these factors between the 2 years.

Within the community domain, there was a significant change between 1997 and 1999 in the association between past year marijuana use and being approached by a drug seller in the past month. The OR for 1997 was 10.90, which indicates that youths who had been approached by a drug seller in the past month had odds of using marijuana in the past month that were nearly 11 times higher than other youths. The comparable OR for 1999 was only 5.83, which indicates that being approached by a drug seller was less closely associated with past year marijuana use in 1999 when compared with 1997. There were no significant differences in the associations with past year marijuana use between 1997 and 1999 for any of the other risk and protective factors in the community or family domain. Within the peer/individual domain, there was a significant change between 1997 and 1999 in the association between the importance of religious beliefs in the youths' lives and use of marijuana in the past year. In 1997, youths who agreed that their religious beliefs were a very important part of their life had odds of marijuana use that were less than half of the odds of use for youths who did not agree with this statement (OR = 0.48). In 1999, this association was stronger; youths in 1999 who agreed that their religious beliefs were a very important part of their lives had odds of marijuana use that were less than one third of the odds of use for youths who did not agree with this statement (OR = 0.30). There were no other significant differences in associations between 1997 and 1999. Note that the associations presented in Table 5.3 are unadjusted, meaning that they have not been adjusted for demographic variables or for other risk and protective factors.

5.4.3 Comparisons of the Predictiveness of the Final Models from 1997 and 1999

In Chapter 4, prediction models were presented in which the risk and protective factors were combined into a single model in order to determine how much variation in past year marijuana use could be explained by these factors (see Table 4.6 in Chapter 4). Similar prediction models were presented in the previous report using the 1997 NHSDA (Lane et al., 2001). These data indicate that the final model from 1997 accounted for slightly more variation in past year marijuana use ($R^2 = 0.35$; $R_N^2 = 0.61$) than the final model from the 1999 CAI ($R^2 = 0.33$; $R_N^2 = 0.56$). This slight drop in the amount of variance explained was surprising giving the larger number of risk and protective factors included in the 1999 NHSDA.

Several reasons for this drop in explanatory power are possible. First, many constructs in the 1999 model were measured using multiple-item scales, whereas all constructs in 1997 were measured using single items. Combining single items into scale scores to measure a construct has the effect of improving the accuracy of item as a "true" measure of the construct; however, the resulting scale scores, which in this case were the mean responses to the individual items, are often less predictive than the set of individual items. Second, different decision rules were used in 1997 and 1999 regarding the variables to be included in these final models. In 1999, factors specific to substance use were included in the multiple regression models predicting marijuana use only if the questions asked specifically about the use of marijuana. In 1997, questions were included in the marijuana prediction models that were specific to cigarettes, alcohol, and illicit drugs other than marijuana. Although questions specific to marijuana are typically the best predictors of marijuana use, the inclusion of these other questions in 1997 may have had the effect of increasing the predictiveness of that model. Third, it could be that in general, risk and protective factors were not as predictive of past year marijuana use in 1999 as they were in 1997.

A number of other noteworthy comparisons between the multiple regression models were conducted on the 1997 NHSDA and the 1999 NHSDA CAI. First, the results from both years show that the peer/individual domain had the highest number of statistically significant risk and protective factors and accounted for the highest amount of variation in past year marijuana use among all the domains. The amount of variance explained by the peer/individual domain alone in 1997 ($R^2 = 0.32$; $R_N^2 = 0.55$) and in 1999 ($R^2 = 0.30$; $R_N^2 = 0.53$) was nearly as high as the variance explained by the full model in each of those years. Second, demographics by themselves accounted for a relatively small, but consistent amount of variation relative to the risk and protective factor domains in both 1997 ($R^2 = 0.07$; $R_N^2 = 0.12$) and in 1999 ($R^2 = 0.09$; $R_N^2 = 0.12$). One notable difference between the models in the 2 years is that in 1999, the school domain accounted for more variation in past year marijuana use ($R^2 = 0.18$; $R_N^2 = 0.32$) compared with the 1997 model ($R^2 = 0.10$; $R_N^2 = 0.18$). This seems to indicate that the expanded set of questions included in the school domain in the 1999 NHSDA were an improvement on the smaller set of school domain questions included in 1997.

5.4.4 Comparison of the Predictiveness of the Items Included in Both 1997 and 1999

Another method of comparing the predictiveness of the set of risk and protective factors between 1997 and 1999 is to compare the results of multiple regression models that include only the questions that were included in both the 1997 and 1999 surveys. Because these models include the same items for both years of the survey, they provide a more direct comparison of whether the associations between risk and protective factors and youth past year marijuana use changed appreciably between 1997 and 1999 than does the comparison of the "final" models from these 2 years.

Table 5.4 presents the results of these prediction models for both the 1997 NHSDA and the 1999 NHSDA PAPI. Each of these models included a set of demographic variables (age, gender, and race/ethnicity) as well as the set of 11 questions that were directly comparable between the 2 years of the survey. Consistent with the results from the final models for 1997 and 1999, the 1997 model accounted for slightly more variation in past year marijuana use ($R^2 = 0.31$; $R_N^2 = 0.53$) than the 1999 model ($R^2 = 0.25$; $R_N^2 = 0.47$). As previously stated, there are a number of possible explanations for the seemingly reduced explained variation in 1999 compared with 1997. One is that the association between use of marijuana and risk and protective factors in general was weaker in 1999 than in 1997. Second, the 1999 PAPI sample size was significantly smaller than the 1997 PAPI sample, and this may have led to a lower percentage of explained variation for 1999. Third, the 11 risk and protective factors that were common to both survey years may not have been representative of the full set of factors; perhaps a different set of factors could have resulted in more explained variation for 1999 than for 1997.

The adjusted ORs presented in Table 5.4 indicate that there were some differences in the associations between the individual questions and past year marijuana use between 1997 and 1999. For example, the odds of past year marijuana use in 1997 were more than 4 times higher for youths who had been approached by a drug seller in the past month compared with youths who had not (OR = 4.04). In 1999, the odds of past year marijuana use were only about 2 times higher for those who had been approached by a drug seller (OR = 1.92). This indicates that after adjusting for the other variables in the model, marijuana use was not as strongly associated with being approached by a drug seller in 1999 as it was in 1997. Another significant change was found for the risk-taking proclivity question that asked how often youths wore a seatbelt when riding in the front passenger seat of a car. In 1997, the odds of past year marijuana use were lower for those who reported that they were more likely to wear a seatbelt (OR = 0.80), whereas there was no significant association between these variables in 1999.

For a discussion of the comparison of predictiveness of the items that were measured using similar but not identical questions in the 1997 and 1999 surveys, see Appendix E.

5.5 Disaggregating the Change in the Prevalence of Past Year Marijuana Use Between 1997 and 1999

The purpose of the discussion in this chapter so far has been to suggest possible explanations for the observed drop in the national prevalence of youth marijuana use between 1997 and 1999 *in terms of changes in the mediating factors* associated with youth marijuana use. It is important to note that the samples for the 2 years reflect two different cohorts of youths aged 12 to 17. As such, the phenomenon of interest, namely, the decrease in prevalence rates of marijuana among youths aged 12 to 17 over the 2-year period, can be estimated most effectively from repeated cross-sectional surveys such as the NHSDA. A traditional longitudinal survey,

which measures how a single cohort changes over time, would at most measure the "cohort" change component (maturation) if the 2 years compared were sufficiently close in time. For example, in a longitudinal survey of youths aged 12 to 17 with a 2-year delay between the baseline and follow-up surveys, only youths aged 12 to 15 in the baseline survey could be included in estimates of youth marijuana use during the follow-up survey 2 years later because older youths (those aged 16 or 17 at the time of the baseline survey) would be older than 17 at the time of the follow-up survey. Similarly, youths aged 12 or 13 at the time of the follow-up survey would have only been 10 or 11, respectively, at the time of the baseline survey.

5.5.1   A Standard Methodology for Measuring Change

One traditional method of examining changing parameters over time (e.g., over 2 years) is to combine the data for both years and specify a model that includes the explanatory variables that are common to the 2 years, a dummy variable for the year, and a set of year-by-explanatory variable interaction terms. This traditional approach was applied with two different models, which are presented in Tables 5.5 and 5.6. In Table 5.5, each of the 11 questions related to risk and protective factors of youth substance use that were common to 1997 and 1999 were coded as dichotomous variables. This was done to increase the sample size within individual year-by-predictor domains, which increases the ability to detect statistically significant differences. Using dichotomous predictors also facilitates a discussion of the direction of any changes between 1997 and 1999. In Table 5.6, all response categories for each of the 11 variables are reflected in the modeling. An advantage of using all response categories is the possibility of explaining more variation, but a disadvantage is the reduced sample size in individual response categories.

The results presented in Model 1 of each table (Tables 5.5 and 5.6) were derived from a model that contained only the main effects of the 11 variables. The results from Model 2 in each table were derived from a model that included all main effects *plus* all of the variable by year interaction effects. In general, the tables showed similar results in going from Model 1 to Model 2. In both the model with the full set of response options and the model with the dichotomous responses, adding the interaction effects, to a slight degree, reduced the lack of fit statistic and increased the explained variation. Both for the main effects model and the full model with interactions, inclusion of the full set of response options for the explanatory variables explained somewhat more of the variation than did the models based on the dichotomized responses. This can be seen in the increase in the Nagelkerke R^2 from $R_N^2 = 0.40$ in the dichotomous model to $R_N^2 = 0.47$ in the model with the full set of response options.

In the model with all of the response categories that contained only the main effects (Model 1 of Table 5.6), a number of the risk and protective main effect variables and their categories were significant. However, the "year" main effect was not significant, either in the

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model with only the main effects (Model 1) or in the model with the added interaction terms (Model 2). Only a single interaction term was significant (year of survey by having been approached by a drug seller in the past year; $p = .0035$).

In the dichotomous model with only the main effects (Model 1 in Table 5.5), the "year" variable was statistically significant, as were many of the risk and protective factors. The fact that the "year" variable was statistically significant implies that the risk and protective factors alone have not fully explained the increase in the prevalence level between 1997 and 1999. When the "year" interaction terms were added (Model 2 in Table 5.5), the "year" main effect was no longer significant, although most of the risk and protective factor main effects maintained their significance. Only 1 out of the 11 interaction terms was significant (year of survey by having been approached by a drug seller in the past year; $p = .0047$), although a second interaction (year of survey by testing yourself by doing something risky) approached significance ($p = .0511$). Together, the combined contribution of all of the interaction effects was significant (likelihood ratio test, $p < .0001$), although the amount of extra explained variation was small (1 percent).

An additional method of determining whether the distributions of risk and protective factors changed substantially between 1997 and 1999 is a comparison of the unadjusted year effect that can be determined from the prevalence rates presented in Exhibit 5.3 (see Section 5.5.2) with the adjusted year effect from Model 1 in Table 5.5. If the 1997 and 1999 risk and protective factor distributions were significantly different, the adjusted year effect in Model 1 would be substantially reduced or partially explained away by the risk and protective factors. This reduction in the log-odds ratio for year would result from the model's indirect standardization to a common risk and protective factor distribution. The unadjusted odds ratio between the 2 years (based on the actual distributions of the risk and protective factors in 1997 and 1999, respectively) can be calculated from the prevalence rates presented in Exhibit 5.3 for those years:

$$[Prevalence_{99} / (100 - Prevalence_{99})] / [Prevalence_{97} / (100 - Prevalence_{97})] = 0.7916.$$

The adjusted odds ratio between the 2 years, adjusted to the average (across 1997 and 1999 combined) distribution of each of the 11 risk and protective factors, can be calculated by exponentiating the "year" effect beta found in Model 1 of Table 5.5. The "year" effect beta in Model 1 equals -0.27, which translates into an odds ratio of $e^{-0.27} = 0.7634$. The small reduction in the adjusted odds ratio compared with the unadjusted odds ratio suggests that the distribution of the risk and protective factors did not change substantially between 1997 and 1999.

One question that is not addressed in this standard methodology is how much these changes, though perhaps small, contributed to the decrease in the youth marijuana prevalence

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rate during that period. Although the changes in all but one interaction effect were nonsignificant, it can be noted from the interaction terms in Table 5.5 that for 7 out of the 11 factors measured, the association with marijuana use changed between 1997 and 1999 in a direction that is consistent with a decrease in marijuana prevalence. This is most readily indicated by the negative signs associated with seven of the interaction terms. Thus, for example, the coefficient for "easy availability of marijuana" was 2.03 in 1997, but only 1.51 (2.03 + [-0.52]) in 1999. Those coefficients translate into conditional odds ratios of 7.61 ($e^{2.03}$) and 4.53 ($e^{1.51}$) in 1997 and 1999, respectively. That is, in 1997, the conditional odds (conditional on the other factors in the model) of having used marijuana in the past year for youths who indicated that it was "fairly easy to obtain marijuana" were 7.61 times greater than for youths who indicated that marijuana was not fairly easy to obtain.[29] In 1999, the conditional odds ratio was lower, 4.53. The other four factors evidenced changes in the opposite direction, as indicated by the positive coefficients of those interaction terms. Combined, the sizes of the changes for the seven variables that went in the direction consistent with the decrease in marijuana prevalence were larger than the sizes of the changes for the four variables that went in the opposite direction.

Because these changes in coefficient sizes are from a national model fitted to the population of youths aged 12 to 17, they represent the *average* change across all youths. To see the impact of these changes on youths with different combinations of the risk and protective factors present, it is instructive to estimate the probability of use for youths who had few of the risk factors present and contrast them with youths having a larger number of risk factors present. For youths who reported that it was fairly easy or very easy to obtain marijuana, who perceived a moderate (or less) risk in using marijuana once a month, and who never or seldom wore a seatbelt when in the front seat of a car (and who were not in the "high-risk" group for the remaining factors [i.e., they did not exhibit the other risk factors, but they did exhibit the remaining protective factors]), the probability of past year use of marijuana was similar between the 2 years (0.054 in 1997 vs. 0.045 in 1999).[30] By contrast, for youths who additionally reported

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[29] The regression coefficients for main effects in 1997 are found in the "β" column under Model 2 in Table 5.5. The regression coefficients for main effects in 1999 are equal to the main effect regression coefficients from Model 2 plus the regression coefficients for the year-by-factor interactions. For example, for easy availability, the regression coefficient for 1999 was 2.03 + (-0.52) = 1.51. The seven variables that changed in a direction consistent with a decrease in marijuana use between 1997 and 1999 were easy availability of marijuana, approached by a drug seller in the past 30 days, perceived risk of using marijuana once or twice a week, youths get a kick out of doing things that are a little dangerous, youths wear a seatbelt when riding in the passenger seat of a car, youths' religious beliefs are very important part of their life, and religious beliefs influence how youths make decisions in their life.

[30] The probability (p) of past year marijuana use for youths who were in the "high-risk" group for a specified subset of risk and protective factors was determined using the formula $p = [e^{\chi\beta} / (e^{\chi\beta} + 1)]$. In 1997, $\chi\beta$ = the sum of the beta for the intercept and the betas for the main effects of the specified subset of risk and protective factors (the relevant betas are in Model 2 of Table 5.5). In 1999, $\chi\beta$ = the sum of the betas from the intercept and the year effect, as well as the betas from the main effects and year-by-factor interaction effects for the specified subset of risk and protective factors.

that they had been approached by a drug seller in the past month, who perceived moderate (or less) risk of using marijuana once or twice a week, and who somewhat or strongly disagreed that religious beliefs are a very important part of their life, the probability of having used marijuana in the past year was 0.587 in 1997, *but only* 0.378 in 1999. This indicates that the probability of marijuana use based on the model decreased dramatically between 1997 and 1999 for the youths in the "high-risk" group (exhibiting more risk factors and fewer protective factors), but only slightly for youths in the lower risk group (exhibiting fewer risk factors and more protective factors). The result that youths in the "high-risk" group have a much higher probability of use in the past year than youths with fewer of the risk factors is consistent with other research indicating that multiple risk factors are typically associated with an increased likelihood of illicit drug use (Newcomb, Maddahian, & Bentler, 1986).

5.5.2 A New Methodology for Measuring Change

From the discussion in Section 5.4 that focused on the changes in both the distributions of the individual variables and in their association with youth marijuana use (or their βs), it is still not possible to obtain a single measure of all of the changes in these distributions or of all the changes in these associations, nor can the relative role that both sources play in the decreased marijuana rate be assessed. Therefore, to attempt to quantify these two factors, a second method of analyzing aggregate trends from repeated surveys also was utilized. This method is similar to various methods suggested by Firebaugh (1997, p. 39). However, the new derivation (Ralph E. Folsom, personal communication, August 2001) is quite different in that it is applicable to logistic regression models for which the predictor variables are categorical. The goal is to partition the aggregate change between prevalence rates for 2 different years into the portion due to changes in distribution of the independent variables as well as to that due to changes in the associated regression coefficients.

5.5.2.1 Methodology

Assume that logistic regression models have been fitted to data from two different surveys, $t = 1,2$. Further assume that the set of predictor variables X is the same for the two surveys and that each predictor variable is categorical. Assume also that the population can be cross-classified by all combinations of X into D domains. Denote the number of persons in the population domain d on occasion t by ($d = 1, ..., D, t = 1, 2$) and their share of the total population as $f_{d,t} = N_{d,t} \Big/ \sum_{d=1}^{D} N_{d,t}$.

If $r_{d,t}$ is the associated expected prevalence rate,

$$r_{d,t} = E_t \left(y | x_d \right) = \frac{1}{1 + \exp(-\beta_t' x_d)} .$$

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Thus, the overall prevalence for occasion t is $P_t = \sum_{d=1}^{D} f_{d,t} r_{d,t}$, and the change between two

occasions is $P_2 - P_1 = \Delta_1 + \Delta_2$, where $\Delta_1 = \sum_{d=1}^{D} (f_{d,2} - f_{d,1})\, \overline{r_d}$ and

$\Delta_2 = \sum_{d=1}^{D} (r_{d,2} - r_{d,1})\, \overline{f_d}$, with $\overline{r_d} = \dfrac{r_{d,1} + r_{d,2}}{2}$ and $\overline{f_d}$ similarly defined. Therefore,

Δ_1 represents the portion of the change due to changes in the distribution of the independent variables (Xs), and Δ_2 represents the portion of change due to changes in regression coefficients (βs).[31]

5.5.2.2 Caveats

Although the preceding equation clearly partitions the change between two occasions into a part due to changes in the prevalence of risk and protective factors and a part due to changes in the direction and degree of association of those risk and protective factors with marijuana use, it is important for several reasons not to overinterpret the results.

First, this partitioning is based on cross-sectional data, and inferences about causality cannot be easily established—if at all—with only cross-sectional data.

Second, an underlying assumption in all of this is that various sources of response and nonresponse bias (e.g., underreporting of marijuana use among youths), as well as sampling errors, have been constant across the 2 years.

Third, given the nature of this equation, one could use *any set of variables in the regression*, even a set in which no variables were related to marijuana use, and the equation would still partition the change in marijuana use into a part due to changes in distribution of independent variables and a part due to changes in the regression coefficients. Note, however, that if this were the case, the partitioning would indicate a large effect for the intercept, with little change attributed to changes in the betas or in the distribution of the independent variables. It also is possible that a set of variables may be associated with marijuana use but not be substantively informative (e.g., there is typically a positive association between height and marijuana use among youths because both variables increase with age among youths).

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[31] The equation used to disaggregate the change due to changes in their distributions and changes in βs is a modification of this equation that further partitions the changes in model parameters into changes due to the intercept (β₀) and changes due to the remainder of the variables (referred to as the slope). The purpose of separating out the impact of the change in intercept is that a change in intercept can occur when there has been no change in the relationship between substance use prevalence and risk and protective factors.

Related to this, note the following general comment from Firebaugh (1997, p. 42):

A decomposition is only as informative as the explanatory variables on which it is based. For example, we could "account for" the decline in voter turnout ["prevalence rate" for this report's purpose] by applying the decomposition equation to any variables that are correlated with voting [i.e., "prevalence rates"] and have exhibited an upward or downward trend over the past three decades [i.e., "time period"]. Such mechanical applications of the method might well yield statistically significant results yet tell us nothing useful about the social world.

Relevant to the above comment, using the Nagelkerke (1991) adjusted R^2, the full set of X variables used in the final multiple regression models (see Chapter 4) were shown to account for approximately 60 and 56 percent of the total variation in past year marijuana use for 1997 and 1999, respectively. The reduced set of explanatory variables—those that are the same for the 2 years and can be used in the partitioning—account for a somewhat smaller amount of variation: approximately 53 percent of the variation in past year use of marijuana in the 1997 model and 47 percent in 1999 (PAPI adjusted). Therefore, any conclusions about the importance of changes in the independent variables or changes in the regression coefficients (βs) relative to their impact on changes in the prevalence rate between 1997 and 1999 should be tempered by this reduced explanatory power. Of course, showing that a set of variables explains a significant amount of the total variation in the prevalence of youth marijuana use tells little about whether those variables can explain a similar amount of the *variation in change between 1997 and 1999*.

Fourth, a number of technical questions and issues still remain unresolved. One issue is that, at present, there is no estimate of the variability associated with the partitioning. A second issue is that the crossing of the response categories of the set of risk and protective factors used in the equation creates a large number of "domains," or cells formed by the intersection of the categories of all 11 questions. The number of these domains depends on how the questions are coded. If the questions are dichotomized, there are approximately 2,000 domains (two categories for each of the 11 questions, or 2^{11}). However, if the full set of response options is used for each of the 11 questions, there are more than 1.3 million domains. Although the inclusion of the undichotomized questions could result in better model fit and therefore a more accurate partition, the inclusion of the undichotomized questions also results in a large number of domains that have no sample records in them either from 1997 or 1999. In addition, the cross-categorization results in a significant number of domains that contain data from only 1 of the 2 years. Although the equation accounts for these records in the net partitioning result and, therefore, still holds true, there is a question whether the results can be interpreted as desired when there are more domains that have observations from only 1 year's data than there are with data from both years. This was especially true when using the full set of response options. In addition, the results using the full set of response options were significantly different from those using the dichotomous

categorization, and it is not clear whether this was caused by the variability of the estimates or some other factor.

Therefore, the only results presented here are for the situation in which the responses to the set of comparable questions were dichotomized. For that case, approximately 80 percent of all observations were in domains in which both years were represented. Other issues relevant to the interpretation of these results include (a) separating out the impact of the change in model parameters to changes from the intercept and changes from the risk and protective factors (or slopes), (b) the consistency of the results for both past year and past month marijuana use, and (c) interpretation of counterintuitive findings (e.g., effects of the change from one component that are larger in absolute value than the total change in the prevalence rates).

5.5.2.3 Results

The set of 11 questions identified as being the same or comparable between the 1997 and 1999 NHSDAs were included in these disaggregation analyses. To better isolate the cause of the change, a partitioning was first done to quantify the contribution of any changes in demographics across the 2 years. Chapter 4 discusses the relatively small amount of variation explained by demographics in models predicting the prevalence level for a given year. Exhibit 5.2 shows that although the prevalence of past year marijuana use decreased 2.80 percent between 1997 and 1999 ([12.98 - 15.78] = -2.80 percent), the changes in demographic characteristics between those 2 years would have increased the prevalence 0.24 percent during

Exhibit 5.2   Partitioning Change in Prevalence of Past Month and Past Year Marijuana Use from 1997 to 1999, with Age Group, Gender, and Race/Ethnicity

	Past Month Marijuana Use (percent)[1]	Past Year Marijuana Use (percent)[1]
Prevalence, 1997 (P_{97})	9.38	15.78
Prevalence, 1999 ($P_{99}{}^{2}$)	7.01	12.98
Change from demographic factors (Δ_1)	0.20	0.24
Change from model parameters (Δ_2)	-2.57	-3.04

Note: Δ_1 represents the portion of change in prevalence from 1997 to 1999[2] that can be attributed to changes in the distribution of demographic variables (age, gender, and race/ethnicity). Δ_2 represents the portion of change in the prevalence from 1997 to 1999[2] that can be attributed to changes in model parameters. $P_{99} - P_{97} = \Delta_1 + \Delta_2$.

[1] Prevalence rates may differ from previously published rates for these surveys because only records that contained nonmissing data for each covariate included in the model were used in creating these prevalence rates.
[2] The 1999 paper-and-pencil interviewing (PAPI) method.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999 PAPI.

this time. Therefore, it is clear that the changes in demographics did not play a significant role in the *decrease* in marijuana use between 1997 and 1999 because, if anything, those changes would have served to *increase* the prevalence rate. Looking at the change that way, these analyses suggest that the observed decrease in past year marijuana use between 1997 and 1999 *would have been greater* (-3.04 percent) *had there been no shift in demographics*. The results for past month use of marijuana are similar.

Exhibit 5.3 shows the decomposition between changes in the distributions of the factors and changes in βs when the response options were constrained to be dichotomous. Note that these prevalence rates differ somewhat from those in Exhibit 5.1. The reason for the difference is that the only records that could be used were those for members of the sample who had nonmissing data for all of the covariates included in the model. For this set of variables, most of the approximately 3 percent drop in prevalence of past year marijuana use ($[13.06 - 15.95] \times 100 = -2.87$ percent) was accounted for by changes in the βs (-2.39), and only a very small part was a result of changes in the distributions (-0.50). Note that the impact of the intercept rounded to 0

Exhibit 5.3 Partitioning Change in Prevalence of Past Month and Past Year Marijuana Use from 1997 to 1999, with Risk and Protective Variables

	Past Month Marijuana Use (percent)[1]	Past Year Marijuana Use (percent)[1]
Prevalence, 1997 (P_{97})	9.49	15.95
Prevalence, 1999 ($P_{99}{}^{2}$)	7.01	13.06
Change from risk and protective factors (Δ_1)	-0.25	-0.50
Change from model parameters (Δ_2)	-2.23	-2.39
Change in intercept	0.00	0.00
Change in slope	-2.23	-2.39

Note: Δ_1 represents the portion of change in prevalence from 1997 to 1999[2] that can be attributed to changes in the distribution of risk and protective factors. Δ_2 represents the portion of change in the prevalence from 1997 to 1999[2] that can be attributed to changes in model parameters. $P_{99} - P_{97} = \Delta_1 + \Delta_2$.

The dataset was partitioned using the following risk and protective factors: availability of marijuana, approached by drug seller in past 30 days, parents as source of social support, perceived risk of using marijuana once a month, perceived risk of using marijuana once or twice a week, gets a kick out of dangerous things, tests self by doing something risky, used seatbelt as front seat passenger, religious beliefs important to life, religious beliefs influence decision, and important for my friends to share my religious beliefs.

[1] Prevalence rates may differ from previously published rates for these surveys because only records that contained nonmissing data for each covariate included in the model were used in creating these prevalence rates.
[2] The 1999 paper-and-pencil interviewing (PAPI) method.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999 PAPI.

for both past year use of marijuana and for past month use. In both cases, the effect of the change in distribution of the factors between 1997 and 1999 was quite small.

The data in Exhibit 5.3 imply that the decrease in the prevalence of youth marijuana use between 1997 and 1999 was due more to changes in the associations between the risk and protective factors and marijuana use than to changes in the distributions (i.e., the percentage of youths indicating the presence of each risk and protective factor in those 2 years). Combined, the changes in the distributions of risk and protective factors between 1997 and 1999 were associated with only about 17 percent (-0.50 / -2.89) of the decrease in past year use of marijuana between those years. The remainder of the decrease was due to changes in the associations between marijuana use and both risk factors and protective factors.

Again, it must be emphasized that these results do not allow for the conclusion of causal relationships. However, they do supply some evidence that the decrease in youth marijuana use between 1997 and 1999 could well have been the net result of attenuation in the relationship between risk factors and marijuana use and a strengthening in the relationship between protective factors and marijuana use. There is an implicit assumption in these comparisons that this set of 11 risk and protective factors that were measured in both 1997 and 1999 are not only "responsible" for the change, but also represent the totality of risk and protective factors that are relevant for change. However, it is known that there are many more risk and protective factors that are also associated with youth marijuana use that could not be included in these comparisons. Therefore, the set of 11 factors used in these comparisons can probably best be viewed more as a representative, rather than a comprehensive, set of risk and protective factors.

Table 5.1   Comparison of Distributions of Risk and Protective Variables and Demographics Measured Using Identical Questions in the 1997 and 1999 NHSDAs

Variable	1997 %	1999 %	X^2	*p* value
Demographics				
Age group				
12 to 14	49.8	48.3	0.65	.4203
15 to 17	50.2	51.7		
Gender				
Male	51.0	51.2	0.02	.9024
Female	49.0	48.8		
Race/ethnicity				
White	67.3	67.4	1.22	.7486
Black	14.3	14.5		
Hispanic	13.3	14.0		
Other	5.1	4.0		
Community Domain				
Availability of Marijuana				
Probably impossible	19.3	19.2	12.21	.0176
Very difficult	11.1	13.1		
Fairly difficult	11.7	13.3		
Fairly easy	21.2	24.0		
Very easy	36.7	30.5		
Approached by Drug Seller in Last 30 Days?				
No	85.4	86.8	1.44	.2312
Yes	14.6	13.2		
Family Domain				
Parents as Source of Social Support				
Would not talk to parent(s) about serious problems	20.1	22.3	1.81	.1793
Would talk to parent(s) about serious problems	79.8	77.7		
Peer/Individual Domain				
Perceived Risk of Marijuana Use				
Risk of using marijuana once a month				
Great risk	30.9	29.5	2.19	.5342
Moderate risk	30.6	32.7		
Slight risk	27.2	27.6		
No risk	11.3	10.3		
Risk of using marijuana once or twice a week				
Great risk	54.0	52.2	7.11	.0711
Moderate risk	26.1	30.2		
Slight risk	13.7	11.7		
No risk	6.2	5.9		

Table 5.1 (continued)

Variable	1997 %	1999 %	Test of Difference Between 1997 and 1999 X^2	*p* value
Peer/Individual Domain (continued)				
Risk-Taking Proclivity				
How often do you get a kick out of doing things that are a little dangerous?				
Never	40.1	39.0	0.90	.8251
Seldom	23.8	23.1		
Sometimes	30.1	31.4		
Always	6.0	6.4		
How often do you test yourself by doing something a little risky?				
Never	39.1	36.0	2.27	.5191
Seldom	28.7	30.2		
Sometimes	27.0	28.5		
Always	5.2	5.3		
How often do you wear a seatbelt when you ride in the front passenger seat of a car?				
Never	8.7	8.2	5.66	.1321
Seldom	8.7	6.9		
Sometimes	21.8	19.8		
Always	60.8	65.2		
Religiosity				
My religious beliefs are a very important part of my life				
Strongly disagree	2.6	4.4	11.48	.0105
Somewhat disagree	13.1	11.9		
Somewhat agree	53.1	47.7		
Strongly agree	31.2	36.1		
My religious beliefs influence how I make decisions in my life				
Strongly disagree	3.4	6.2	15.86	.0015
Somewhat disagree	20.8	16.8		
Somewhat agree	50.0	48.6		
Strongly agree	25.8	28.3		
It is important that my friends share my religious beliefs				
Strongly disagree	15.6	21.1	17.47	.0007
Somewhat disagree	52.1	43.5		
Somewhat agree	25.1	27.5		
Strongly agree	7.3	7.9		

Note 1: The 1999 NHSDA data were derived from the 1999 paper-and-pencil interviewing (PAPI) data, with weights adjusted for field interviewer experience.

Note 2: No questions from the school domain were identical in the 1997 and 1999 NHSDAs.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

Table 5.2 Comparison of Distributions of *Dichotomous* Risk and Protective Variables Measured Using Identical Questions in the 1997 and 1999 NHSDAs

Variable	1997 %	1999 %	Test of Difference Between 1997 and 1999 T	Test of Difference Between 1997 and 1999 *p* value
Community Domain				
Availability of Marijuana				
Probably impossible / Very-Fairly difficult	42.1	45.5	-1.83	.0685
Fairly easy/ Very easy	57.9	54.5		
Approached by Drug Seller in Last 30 Days?				
No	85.4	86.8	-1.20	.2305
Yes	14.6	13.2		
Family Domain				
Parents as Source of Social Support				
Would not talk to parent(s) about serious problems	20.2	22.3	-1.35	.1771
Would talk to parent(s) about serious problems	79.8	77.7		
Peer/Individual Domain				
Perceived Risk of Marijuana Use				
Risk of using marijuana once a month				
Great risk	30.9	29.5	0.81	.4173
Moderate / Slight/ No risk	69.1	70.5		
Risk of using marijuana once or twice a week				
Great risk	54.0	52.2	0.94	.3501
Moderate / Slight / No risk	46.0	47.8		
Risk-Taking Proclivity				
How often do you get a kick out of doing things that are a little dangerous?				
Never / Seldom	63.9	62.1	0.94	.3480
Sometimes / Always	36.1	37.9		
How often do you test yourself by doing something a little risky?				
Never / Seldom	67.8	66.2	0.83	.4057
Sometimes / Always	32.2	33.8		
How often do you wear a seatbelt when you ride in the front passenger seat of a car?				
Never / Seldom	17.4	15.1	1.49	.1369
Sometimes / Always	82.6	85.0		
Religiosity				
My religious beliefs are a very important part of my life				
Strongly - Somewhat disagree	15.7	16.3	-0.39	.6992
Somewhat - Strongly agree	84.3	83.8		
My religious beliefs influence how I make decisions in my life				
Strongly - Somewhat disagree	24.2	23.1	0.61	.5394
Somewhat - Strongly agree	75.8	76.9		
It is important that my friends share my religious beliefs				
Strongly - Somewhat disagree	67.7	64.5	1.47	.1424
Somewhat - Strongly agree	32.3	35.5		

Note 1: The 1999 NHSDA data were derived from the 1999 paper-and-pencil interviewing (PAPI) data, with weights adjusted for field interviewer experience.
Note 2: No questions from the school domain were identical in the 1997 and 1999 NHSDAs.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

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Table 5.3   Comparison of *Unadjusted Associations* with Past Year Marijuana Use of *Dichotomized* Risk and Protective Factors and Demographics Measured Using Identical Questions in the 1997 and 1999 NHSDAs

Variable	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value	*t*-test value[1]	df	*p* value
	1997 NHSDA				**1999 NHSDA**				**Test of Difference Between 1997 and 1999**		
Demographics											
Age (15 to 17 vs. 12 to 14)	1.51	4.52	(3.62, 5.65)	<.0001	1.78	5.95	(3.99, 8.89)	<.0001	1.19	1	.2358
Gender (males vs. females)	-0.03	0.97	(0.81, 1.17)	.7694	-0.06	1.06	(0.75, 1.51)	.7259	0.45	1	.6549
Race/ethnicity											
Black vs. white	-0.23	0.79	(0.60, 1.04)	.0958	-0.17	0.85	(0.57, 1.25)	.3939	0.27	1	.7869
Hispanic vs. white	-0.20	0.82	(0.64, 1.04)	.1076	-0.13	0.88	(0.58, 1.33)	.5414	0.30	1	.7682
Other vs. white	0.26	1.30	(0.74, 2.30)	.3587	-0.24	0.79	(0.36, 1.71)	.5449	-1.03	1	.3022
Community Domain											
Marijuana fairly/very easy to obtain	2.70	14.87	(10.8, 20.4)	<.0001	2.34	10.38	(6.05, 17.8)	<.0001	-1.14	1	.2562
Approached by drug seller in past 30 days (yes vs. no)	2.39	10.90	(8.67, 13.7)	<.0001	1.76	5.83	(3.84, 8.86)	<.0001	-2.60	1	.0100
Family Domain											
Parents as source of social support (yes vs. no)	-1.22	0.30	(0.25, 0.36)	<.0001	-1.09	0.34	(0.24, 0.48)	<.0001	0.66	1	.5086
Peer/Individual Domain											
Perceived Risk of Marijuana Use											
Less than great risk of using marijuana once a month	2.12	8.30	(5.84, 11.8)	<.0001	2.11	8.23	(3.97, 17.0)	<.0001	-0.02	1	.9832
Less than great risk of using marijuana once or twice a week	2.23	9.34	(7.09, 12.3)	<.0001	1.99	7.29	(4.25, 12.5)	<.0001	-0.81	1	.4180

Table 5.3 (continued)

| Variable | 1997 NHSDA | | | | 1999 NHSDA | | | | Test of Difference Between 1997 and 1999 | | |
	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value	*t*-test value[1]	df	*p* value
Peer/Individual Domain (continued)											
Risk-Taking Proclivity											
Sometimes / always get a kick out of doing things that are a little dangerous	1.28	3.60	(2.97, 4.37)	<.0001	1.12	3.05	(2.26, 4.11)	<.0001	-0.92	1	.3597
Sometimes / always test yourself by doing something a little risky	1.02	2.76	(2.28, 3.35)	<.0001	1.01	2.75	(2.07, 3.66)	<.0001	-0.02	1	.9819
Never / seldom wear a seatbelt when you ride in the front passenger seat of a car	0.75	2.12	(1.72, 2.61)	<.0001	0.70	2.01	(1.40, 2.90)	.0002	-0.24	1	.8108
Religiosity											
My religious beliefs are a very important part of my life	-0.73	0.48	(0.38, 0.61)	<.0001	-1.20	0.30	(0.22, 0.42)	<.0001	-2.33	1	.0207
My religious beliefs influence how I make decisions in my life	-0.80	0.45	(0.37, 0.54)	<.0001	-1.11	0.33	(0.24, 0.45)	<.0001	-1.63	1	.1035
It is important that my friends share my religious beliefs	-0.83	0.44	(0.34, 0.56)	<.0001	-0.81	0.44	(0.30, 0.65)	<.0001	0.06	1	.9529

Note 1: The 1999 NHSDA data were derived from the 1999 paper-and-pencil interviewing (PAPI) data, with weights adjusted for field interviewer experience.
Note 2: No questions from the school domain were identical in the 1997 and 1999 NHSDAs.

[1] Significance tests indicate whether the interaction terms (factor × year) are significantly different from zero.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

Table 5.4 Comparison of *Adjusted Associations* with Past Year Marijuana Use of Risk and Protective Factors and Demographics Measured Using Identical Questions in the 1997 and 1999 NHSDAs

| Variable | 1997 NHSDA | | | | 1999 NHSDA | | | | Test of Difference Between 1997 and 1999 | | |
	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value	*t*-test value[1]	df	*p* value
Demographics											
Age (15 to 17 vs. 12 to 14)	0.90	2.46	(1.86, 3.25)	<.0001	1.26	3.54	(1.95, 6.44)	.0001	1.09	1	.2774
Gender (males vs. females)	0.36	1.43	(1.11, 1.84)	.0068	0.28	1.33	(0.79, 2.23)	.2797	-0.24	1	.8079
Race/ethnicity											
Black vs. white	-0.38	0.68	(0.49, 0.95)	.0230	0.33	1.38	(0.79, 2.42)	.2518	2.16	1	.0321
Hispanic vs. white	-0.15	0.86	(0.60, 1.24)	.4189	-0.07	0.93	(0.56, 1.55)	.7900	0.26	1	.7980
Other vs. white	0.77	2.16	(1.23, 3.80)	.0081	0.33	1.38	(0.73, 2.62)	.3156	-1.03	1	.3037
Community Domain											
Easy availability of marijuana	0.71	2.03	(1.77, 2.33)	<.0001	0.69	1.98	(1.63, 2.42)	<.0001	-0.18	1	.8546
Approached by drug seller in past 30 days (yes vs. no)	1.40	4.04	(3.03, 5.38)	<.0001	0.65	1.92	(1.18, 3.14)	.0094	-2.58	1	.0104
Family Domain											
Parents as source of social support (yes vs. no)	-0.57	0.56	(0.43, 0.75)	.0001	-0.33	0.72	(0.46, 1.12)	.1394	0.91	1	.3662
Peer/Individual Domain											
Perceived Risk of Marijuana Use											
Low risk of using marijuana once a month	0.43	1.54	(1.29, 1.85)	<.0001	0.38	1.46	(1.05, 2.01)	.0229	-0.31	1	.7534
Low risk of using marijuana once or twice a week	0.68	1.98	(1.63, 2.40)	<.0001	0.69	1.99	(1.36, 2.89)	.0004	0.02	1	.9880
Risk-Taking Proclivity											
How often do you get a kick out of doing things that are a little dangerous?	0.36	1.43	(1.24, 1.65)	<.0001	0.34	1.40	(1.07, 1.83)	.0158	-0.14	1	.8887
How often do you test yourself by doing something a little risky?	-0.12	0.89	(0.76, 1.05)	.1657	0.18	1.20	(0.89, 1.63)	.2316	1.72	1	.0866
How often do you wear a seatbelt when you ride in the front passenger seat of a car?	-0.23	0.80	(0.70, 0.92)	.0015	0.08	1.08	(0.87, 1.35)	.4910	2.31	1	.0219

Table 5.4 (continued)

Variable	1997 NHSDA				1999 NHSDA				Test of Difference Between 1997 and 1999		
	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value	*t*-test value[1]	df	*p* value
Peer/Individual Domain (continued)											
Religiosity											
My religious beliefs are a very important part of my life	0.10	1.11	(0.83, 1.49)	.4820	-0.32	0.73	(0.53, 1.01)	.0562	-1.90	1	.0583
My religious beliefs influence how I make decisions in my life	-0.12	0.88	(0.68, 1.16)	.3688	-0.13	0.88	(0.61, 1.25)	.4628	-0.05	1	.9629
It is important that my friends share my religious beliefs	-0.11	0.89	(0.75, 1.06)	.2080	-0.04	0.96	(0.70, 1.34)	.8293	0.40	1	.6863
Sample size		7,169				3031					
R^2 (see footnote 1)		0.31				0.25					
R_N^2 (see footnote 2)		0.53				0.47					

Note: The 1999 NHSDA data were derived from the 1999 paper-and-pencil interviewing (PAPI) data, with weights adjusted for field interviewer experience.

[1] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1 - [L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and *n* is the sample size.

[2] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

Table 5.5 Main Effects and Interactions (Year × Factor) in the Associations Between *Dichotomous* Risk and Protective Factors and Past Year Marijuana Use in 1997 and 1999: Combined 1997 and 1999 NHSDAs

Covariates	Model 1 (Main Effects Only)		Model 2 (Main Effects + Interactions)	
	β	*p* value	β	*p* value
Intercept	-4.37	<.0001	-4.93	<.0001
Main Effects				
Year				
1999 vs. 1997	-0.27	.0499	0.68	.2293
Easy availability of marijuana				
Fairly easy/Very easy vs. Probably impossible/Very-Fairly difficult	1.74	<.0001	2.03	<.0001
Approached by drug seller in past 30 days				
Yes vs. No	1.25	<.0001	1.69	<.0001
Parents as source of social support				
Yes vs. No	-0.48	.0004	-0.69	<.0001
Perceived risk of using marijuana once a month				
Moderate-Slight-No risk vs. Great risk	0.80	.0002	0.69	.0020
Perceived risk of using marijuana once or twice a week				
Moderate-Slight-No risk vs. Great risk	1.36	<.0001	1.55	<.0001
How often do you get a kick out of doing things that are a little dangerous				
Always/Sometimes vs. Seldom/Never	0.48	<.0001	0.52	<.0001
How often do you test yourself by doing something a little risky				
Always/Sometimes vs. Seldom/Never	0.13	.3152	-0.12	.3031
How often do you wear a seatbelt when you ride in the front passenger seat of a car				
Never/Seldom vs. Sometimes/Always	0.19	.2087	0.46	.0012
My religious beliefs are a very important part of my life				
Strongly-Somewhat agree vs. Somewhat-Strongly disagree	-0.26	.1143	0.02	.9227
My religious beliefs influence how I make decisions in my life				
Strongly-Somewhat agree vs. Somewhat-Strongly disagree	-0.24	.1336	-0.08	.6494
It is important that my friends share my religious beliefs				
Strongly-Somewhat agree vs. Somewhat-Strongly disagree	-0.18	.1909	-0.37	.0062

Table 5.5 (continued)

Covariates	Model 1 (Main Effects Only)		Model 2 (Main Effects + Interactions)	
	β	*p* value	β	*p* value
Interactions (Year × Factor)				
Year × Ease of obtaining marijuana	--	–	-0.52	.1312
Year × Approached by drug seller	--	--	-0.83	.0047
Year × Parents as source of social support	--	--	0.37	.1563
Year × Risk of using marijuana once a month	--	–	0.25	.5754
Year × Risk of using marijuana once or twice a week	--	--	-0.33	.3722
Year × Get a kick of doing things that are a little dangerous	--	--	-0.12	.6264
Year × Test yourself by doing something a little risky	--	--	0.51	.0511
Year × How often wear seatbelt when riding in passenger seat of a car	--	--	-0.46	.1184
Year × Importance of religious beliefs	--	--	-0.50	.1178
Year × Religious beliefs influence decisions	--	--	-0.37	.2683
Year × Important that friends share religious beliefs	--	--	0.36	.1912
R^2 (see footnote 1)	0.22		0.23	
R_N^2 (see footnote 2)	0.40		0.41	

Note: The 1999 NHSDA data were derived from the 1999 paper-and-pencil interviewing (PAPI) data, with weights adjusted for field interviewer experience.

[1] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1 - [L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and n is the sample size.

[2] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

Table 5.6 Main Effects and Interactions (Year × Factor) in the Associations Between Risk and Protective Factors and Past Year Marijuana Use in 1997 and 1999: Combined 1997 and 1999 NHSDAs

Covariates	Model 1 (Main Effects Only)		Model 2 (Main Effects + Interactions)	
	β	*p* value	β	*p* value
Intercept	-5.53	<.0001	-6.13	<.0001
Main Effects				
Year				
(1) 1999 vs. (2) 1997	-0.15	.2484	0.50	.5937
Easy availability of marijuana				
(1) Probably impossible	0.00	--	0.00	--
(2) Very difficult	0.69	.1497	0.20	.6830
(3) Fairly difficult	2.05	<.0001	1.72	.0001
(4) Fairly easy	2.53	<.0001	2.54	<.0001
(5) Very easy	3.35	<.0001	3.19	<.0001
Approached by drug seller in past 30 days				
(2) Yes vs. (1) No	1.01	<.0001	1.43	<.0001
Parents as source of social support				
(2) Yes vs. (1) No	-0.50	.0001	-0.63	<.0001
Perceived risk of using marijuana once a month				
(1) Great risk	0.00	--	0.00	--
(2) Moderate risk	0.53	.0314	0.36	.1482
(3) Slight risk	0.95	<.0001	0.96	.0001
(4) No risk	1.49	<.0001	1.33	<.0001
Perceived risk of using marijuana once or twice a week				
(1) Great risk	0.00	--	0.00	--
(2) Moderate risk	0.62	.0017	0.76	.0001
(3) Slight risk	1.32	<.0001	1.37	<.0001
(4) No risk	1.65	<.0001	1.80	<.0001
How often do you get a kick out of doing things that are a little dangerous				
(1) Never	0.00	--	0.00	--
(2) Seldom	0.64	.0013	0.41	.0365
(3) Sometimes	0.74	.0001	0.76	<.0001
(4) Always	1.13	<.0001	1.00	.0006
How often do you test yourself by doing something a little risky				
(1) Never	0.00	--	0.00	--
(2) Seldom	-0.01	.9640	0.03	.8928
(3) Sometimes	0.05	.8038	-0.27	.1473
(4) Always	-0.20	.5131	-0.32	.3544

Table 5.6 (continued)

Covariates	Model 1 (Main Effects Only)		Model 2 (Main Effects + Interactions)	
	β	*p* value	β	*p* value
How often do you wear a seatbelt when you ride in the front passenger seat of a car				
(1) Never	0.02	.9406	0.47	.0253
(2) Seldom	0.23	.2688	0.43	.0532
(3) Sometimes	0.19	.1695	0.33	.0317
(4) Always	0.00	--	0.00	--
My religious beliefs are a very important part of my life				
(1) Strongly disagree	0.00	--	0.00	--
(2) Disagree	-0.46	.3287	0.22	.6215
(3) Agree	-0.48	.3031	0.37	.4300
(4) Strongly agree	-0.56	.2586	0.38	.4575
My religious beliefs influence how I make decisions in my life				
(1) Strongly disagree	0.00	--	0.00	--
(2) Disagree	-0.07	.8699	-0.21	.5536
(3) Agree	-0.12	.7753	-0.17	.6770
(4) Strongly agree	-0.33	.4437	-0.48	.3241
It is important that my friends share my religious beliefs				
(1) Strongly disagree	0.00	--	0.00	--
(2) Disagree	-0.10	.5432	0.02	.9011
(3) Agree	-0.25	.2231	-0.31	.1629
(4) Strongly agree	0.01	.9718	-0.16	.6414
Interactions (Year × Factor)				
Year × Ease of obtaining marijuana (1)	--	–	0.00	--
Year × Ease of obtaining marijuana (2)	--	--	0.93	.2975
Year × Ease of obtaining marijuana (3)	--	–	0.71	.2824
Year × Ease of obtaining marijuana (4)	--	–	0.06	.9234
Year × Ease of obtaining marijuana (5)	--	--	0.46	.4081
Year × Approached by drug seller	--	--	-0.80	.0035
Year × Parents as source of social support	--	--	0.23	.3822
Year × Risk of marijuana use once a month (1)	--	--	0.00	--
Year × Risk of marijuana use once a month (2)	--	--	0.40	.4309
Year × Risk of marijuana use once a month (3)	--	--	0.08	.8609
Year × Risk of marijuana use once a month (4)	--	--	0.35	.5596
Year × Risk of marijuana use once or twice a week (1)	--	--	0.00	--
Year × Risk of marijuana use once or twice a week (2)	--	--	-0.25	.5587
Year × Risk of marijuana use once or twice a week (3)	--	--	0.05	.9235
Year × Risk of marijuana use once or twice a week (4)	--	–	-0.19	.7552

Table 5.6 (continued)

Covariates	Model 1 (Main Effects Only)		Model 2 (Main Effects + Interactions)	
	β	*p* value	β	*p* value
Year × Get a kick of doing things that are a little dangerous (1)	--	--	0.00	--
Year × Get a kick of doing things that are a little dangerous (2)	--	--	0.32	.4443
Year × Get a kick of doing things that are a little dangerous (3)	--	--	-0.15	.7111
Year × Get a kick of doing things that are a little dangerous (4)	--	--	0.19	.7354
Year × Tests self by doing things that are a little risky (1)	--	--	0.00	--
Year × Tests self by doing things that are a little risky (2)	--	--	-0.11	.7777
Year × Tests self by doing things that are a little risky (3)	--	--	0.70	.0779
Year × Tests self by doing things that are a little risky (4)	--	--	0.26	.6974
Year × How often wear seatbelt when riding in passenger seat of a car (1)	--	--	-0.89	.0785
Year × How often wear seatbelt when riding in passenger seat of a car (2)	--	--	-0.37	.3991
Year × How often wear seatbelt when riding in passenger seat of a car (3)	--	--	-0.31	.2825
Year × How often wear seatbelt when riding in passenger seat of a car (4)	--	--	0.00	--
Year × Importance of religious beliefs (1)	--	--	0.00	--
Year × Importance of religious beliefs (2)	--	--	-0.92	.2403
Year × Importance of religious beliefs (3)	--	--	-1.18	.1316
Year × Importance of religious beliefs (4)	--	--	-1.40	.1020
Year × Religious beliefs influence decisions (1)	--	--	0.00	--
Year × Religious beliefs influence decisions (2)	--	--	0.19	.7805
Year × Religious beliefs influence decisions (3)	--	--	-0.03	.9729
Year × Religious beliefs influence decisions (4)	--	--	0.13	.8693
Year × Important that friends share religious beliefs (1)	--	--	0.00	--
Year × Important that friends share religious beliefs (2)	--	--	-0.21	.5128
Year × Important that friends share religious beliefs (3)	--	--	0.12	.7644
Year × Important that friends share religious beliefs (4)	--	--	0.37	.5882
R^2 (see footnote 1)	0.26		0.27	
R_N^2 (see footnote 2)	0.47		0.48	

Note: The 1999 NHSDA data were derived from the 1999 paper-and-pencil interviewing (PAPI) data, with weights adjusted for field interviewer experience.

[1] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1 - [L(O)/L(\hat{\beta})]^{2/n}$, where L(O) is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and *n* is the sample size.

[2] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

Chapter 6. Discussion

This report presents the first comprehensive analysis of the expanded set of risk and protective factors included in the 1999 National Household Survey on Drug Abuse (NHSDA). Chapter 2 presents the prevalence levels of the risk and protective factor measures using single items and the average scale scores and distributions of the youth scores for the risk and protective factor measures using multiple items. These nationally representative scores by age, race/ethnicity, and gender may provide useful benchmarks for other smaller studies.

Chapter 3 presents the association of these variables with past year marijuana use, revealing the same types of strong associations with marijuana that were exhibited in the report on the 1997 NHSDA (Lane et al., 2001). These relations also are presented separately by racial/ethnic groups and gender and subsequently explored for additional demographic variables, including household income, number of parents in the household, county type, and geographic region. For most of the risk and protective factors, controlling for these demographic variables did not alter the expected relationship between these factors and substance use.

Chapter 4 presents multiple logistic regression models that assess the ability of the enhanced set of risk and protective variables in the 1999 survey to predict youth past year marijuana use (using "prediction" to refer to an association between independent variables and marijuana use in a cross-sectional survey). The results indicate that the explanatory power of the 1999 model was similar to the 1997 model. Among the four domains of risk and protective factors, the peer/individual domain explained the largest amount of variation, with the strongest predictors being participation in antisocial behavior, friends' marijuana use, low perceived risk of marijuana use, and positive attitude toward marijuana use. The finding that the peer/individual domain contained the strongest predictors of youth marijuana use was consistent with the results of the 1997 report.

An implication for future research of the relative explanatory power of the different domains is that constructs from the peer/individual domain should be given a stronger representation (relative to the other domains) in the annual fielding of the survey. However, one should be cautious when using the amount of explained variation as the sole basis for interpreting the relative importance of these domains. For example, Kandel (1996) noted two possible reasons that the influence of peers can be overstated relative to the influence of families in studies such as this. First, parents often play an important role in youths' selection of friends, but cross-sectional surveys, such as the NHSDA, confound these peer selection and family socialization effects. Second, these types of studies rely on perceptions of peer behaviors rather than peer self-reports. The effect of a youth's projection of his or her own attitudes to those of his or her peers may be significant; however, in the context of the *combined* influence of the

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individual and his or her peers, the impact will not be large because the individual variables themselves account for most of the explained variation. For the purpose of balance, some constructs should be included from each of the domains, perhaps based on their explanatory power.

The enhancement of the questions relating to school appeared to improve the explanatory power of the school domain, relative to 1997. It was informative to note that although the total explanatory power of the risk and protective factors remained quite high for both the 1997 NHSDA and the 1999 NHSDA, the enhancement of the Youth Experiences module in the 1999 NHSDA did not increase this explanatory power. In fact, it was slightly lower in 1999 compared with 1997.

Chapter 4 also includes a section on hierarchical modeling, the goal of which was to indicate how this type of modeling can result in richer models, and how those models might lead to a better understanding of substance use (e.g., marijuana use) among youths. These models indicate that most of the total variation in past year use of marijuana among youths aged 12 to 17 occurred at the person level (79 percent), while another 15 percent was present at the family level and 6 percent at the neighborhood level. In the example, it is noted that relatively large percentages of the variation at the community level (58 percent) and family level (40 percent) were explained by the hierarchical model, but a relatively small percentage was explained at the person level (18 percent)—implying that those models could be improved at the person level. The example suggests that it would be helpful to know what percentage of person-level marijuana use is explained by the final model of Chapter 4 (Table 4.6). The example, which included only one person-level variable, also suggests that more research is needed to determine how much of the total person-level variation in marijuana use would be explainable if the full set of risk and protective factors were included.

Chapter 5 includes an investigation into whether the decrease in the prevalence rate of youth marijuana use between 1997 and 1999 could be attributed to changes in the risk and protective factors. One limitation was that these analyses were necessarily restricted to risk and protective factors that were measured using the same questions in both the 1997 and 1999 NHSDAs; this requirement limited these analyses to 11 comparable questions. Nevertheless, that set of factors was able to "explain" about 50 percent of the total variation in past year marijuana use in each of those 2 years. To compare the models in the 2 years, the changes in factors were grouped into two sets: changes in the distributions of the risk and protective factors and changes in the individual associations between the risk and protective factors and youth marijuana use. The 11 variables were first examined individually, and for some variables there had indeed been changes in both the distributions and the individual associations with marijuana use between 1997 and 1999. However, the direction of the changes was inconsistent, which made it difficult to reach overall conclusions from those analyses.

In an attempt to obtain a more comprehensive picture of the impact of the risk and protective factors on the change in past year marijuana use among youths, a traditional model was used in which the 1997 and 1999 data were combined, with the goal of assessing how the addition of a "year" variable and the interaction terms of year by each risk and protective factor variable would affect the model. Although the year and a number of the risk and protective variables showed significant main effects, very few of the individual interaction terms were significant. Nevertheless, collectively the addition of the year-by-factor interaction terms resulted in a small, but statistically significant, increase in the explained variation in past year marijuana use. However, that type of analysis did not directly address the impact of changes in the distribution of risk or protective factors—relative to the impact of changes in the associations between the risk or protective factors and marijuana use—on the decrease in youth marijuana use between 1997 and 1999.

In the final analyses of Chapter 5, a new technique is used to *partition* the change in youth marijuana use between 1997 and 1999 into different components. This partitioning was estimated from models based on the set of 11 common explanatory variables. In the first partitioning, it was confirmed that changes in demographics had little effect on the change in the prevalence of youth marijuana use between 1997 and 1999. The second partitioning was aimed at disaggregation of the effects of the risk and protective factors into changes in the distributions (i.e., the prevalence) of the factors and changes in the strength of the association of those factors with marijuana use. The implications of this disaggregation are tentative at present because the methodology is new, the estimated variance of the estimates is not known, and the number of risk and protective factors that were common to both years was small. It appears, however, that more of the decrease in prevalence rates of marijuana between 1997 and 1999 was due to changes in the strength of the associations between the risk and protective factors and marijuana use than to changes in the distributions of these factors. The pattern of changes in the associations of both risk and protective factors with marijuana use between 1997 and 1999 (see Section 5.5.1) further suggests that the relationship between risk factors and using marijuana was weakened during that period while the relationship between protective factors and not using marijuana was strengthened.

Future analyses that compare multiple years of data will benefit from having larger samples and a larger set of common risk and protective factors between years. Because it appears that these factors can change in their importance and relationship to drug prevalence rates over time—in addition to changes in the percentages of youths who evidence each of the factors—it is important to identify those factors that are most related to substance use and to track them over time.

Other research currently under way may help to better understand trends in youth substance use. For example, a report is being prepared that focuses on transition probabilities,

including moving from drug nonuse to use and from current drug use to continuation or quitting. That report deals with transitions for both youths and adults and on how these transition probabilities change over time. A second example is a report that is being prepared on the increase in youth marijuana use during the period from 1992 to 1997. The latter report analyzes a number of reasons that were suggested for the increase and tries to draw conclusions about the most likely causes. Included among those analyses are the effects of risk and protective factors and the role of increases in the number of new users of a substance over a number of years.

One goal of future research using the NHSDA will be to monitor a stable set of risk and protective factors of youth substance use and to analyze changes in those factors to determine whether they could account for changes in the prevalence of youth substance use.

References

Bachman, J. G., Johnston, L. D., & O'Malley, P. M. (1998). Explaining recent increases in students' marijuana use: Impacts of perceived risks and disapproval, 1976 through 1996. *American Journal of Public Health, 88*, 887-892.

Bauman, K. E. (1980). *Research methods for community health and welfare: An introduction*. New York: Oxford University Press.

Bielick, S., Chandler, K., & Broughman, S. P. (2001, July). *Homeschooling in the United States: 1999* (NCES 2001-033, Statistical Analysis Report, National Household Education Surveys Program). Washington, DC: U.S. Department of Education, National Center for Education Statistics, Office of Educational Research and Improvement. [Available as a PDF at http://nces.ed.gov/pubs2001/2001033.pdf]

Bock, R. D. (Ed.). (1989). *Multilevel analysis of educational data*. San Diego, CA: Academic Press.

Botvin, G. J., Botvin, E. M., & Ruchlin, H. (1998). School-based approaches to drug abuse prevention: Evidence for effectiveness and suggestions for determining cost-effectiveness. In W. J. Bukoski & R. I. Evans (Eds.), *Cost-benefit/cost-effectiveness research of drug abuse prevention: Implications for programming and policy* (NIH Publication No. 98-4021, NIDA Research Monograph 176, pp. 59-82). Rockville, MD: National Institute on Drug Abuse. [Available at http://165.112.78.61/pdf/monographs/monograph176/download176.html]

Bryk, A. S., Thum, Y. M., Easton, J. Q., & Luppescu, S. (1998). Assessing school academic productivity: The case of Chicago school reform. *Social Psychology of Education, 2,* 103-142.

Catalano, R. F., Hawkins, J. D., Berglund, M. L., Pollard, J. A., & Arthur, M. W. (2002). Prevention science and positive youth development: Competitive or cooperative frameworks. *Journal of Adolescent Health, 31*, 230-239.

Center for Substance Abuse Prevention. (2001). *2001 annual report on science-based prevention programs*. Rockville, MD: Substance Abuse and Mental Health Services Administration. [Available as a PDF at http://www.samhsa.gov/centers/csap/modelprograms/pdfs/2001Annual.pdf]

Chromy, J., Davis, T., Packer, L., & Gfroerer, J. (2002). Mode effects on substance use measures: Comparison of 1999 CAI and PAPI data. In J. Gfroerer, J. Eyerman, & J. Chromy (Eds.), *Redesigning an ongoing national household survey: Methodological issues* (pp. 135-159, DHHS Publication No. SMA 03-3768). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies. [Available at http://www.samhsa.gov/oas/nhsda/methods.cfm#Reports]

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cox, D. R., & Snell, E. J. (1989). *The analysis of binary data* (2nd ed.). London, England: Chapman and Hall.

Dempster, A. P., Rubin, D. B., & Tsutakawa, R. K. (1981). Estimation in covariance components models. *Journal of the American Statistical Association, 76*, 341-353.

Duncan, T. E., Duncan, S. C., Hops, H., & Alpert, A. (1997). Multi-level covariance structure analysis of intra-familial substance use. *Drug and Alcohol Dependence, 46*, 167-180.

Elston, R. C., & Grizzle, J. E. (1962). Estimation of time response curves and their confidence bands. *Biometrics, 18*, 148-159.

Firebaugh, G. (1997). *Analyzing repeated surveys* (Quantitative Applications in the Social Sciences Series, Vol. 115). Thousand Oaks, CA: Sage Publications.

Gfroerer, J., Eyerman, J., & Chromy, J. (Eds.). (2002). *Redesigning an ongoing national household survey: Methodological issues* (DHHS Publication No. SMA 03-3768). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies. [Available at http://www.samhsa.gov/oas/nhsda/methods.cfm#Reports]

Gfroerer, J. C., Wu, L.-T., & Penne, M. A. (2002). *Initiation of marijuana use: Trends, patterns, and implications* (DHHS Publication No. SMA 02-3711, Analytic Series A-17). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies. [Available at http://www.samhsa.gov/oas/analytic.htm]

Goldstein, H. (1995). *Multilevel statistical models* (2nd ed.). New York: Wiley. [For updates by the author, see http://www.arnoldpublishers.com/support/goldstein.htm]

Goldstein, H., & Rasbash, J. (1996). Improved approximations for multilevel models with binary responses. *Journal of the Royal Statistical Society, A-159*, 505-513.

Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, *112*(1), 64-105.

Hughes, A., Chromy, J., Giacoletti, K., & Odom, D. (2002). Impact of interviewer experience on respondent reports of substance use. In J. Gfroerer, J. Eyerman, & J. Chromy (Eds.), *Redesigning an ongoing national household survey: Methodological issues* (pp. 161-184, DHHS Publication No. SMA 03-3768). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies. [Available at http://www.samhsa.gov/oas/nhsda/methods.cfm#Reports]

Kandel, D. B. (1996). The parental and peer contexts of adolescent deviance: An algebra of interpersonal influences. *Journal of Drug Issues, 26*, 289-315.

Kreft, I. G. G. (1994). Multilevel models for hierarchically nested data: Potential applications in substance abuse prevention research. In L. M. Collins & L. A. Seitz (Eds.), *Advances in data analysis for prevention intervention research* (NIH Publication No. 94-3599, NIDA Research Monograph 142, pp.140-184). Rockville, MD: National Institute on Drug Abuse. [Available as a PDF from http://www.nida.nih.gov/PubCat/PubsIndex.html at http://165.112.78.61/pdf/monographs/download142.html]

Krosnick, J. A., & Judd, C. M. (1982). Changes in social influence at adolescence: Who induces cigarette smoking? *Developmental Psychology, 18*, 359-368.

Laird, N. M., & Ware, J. H. (1982). Random-effects models for longitudinal data. *Biometrics, 38*, 963-974.

Lane, J., Gerstein, D., Huang, L., & Wright, D. (2001). *Risk and protective factors for adolescent drug use: Findings from the 1997 National Household Survey on Drug Abuse* (DHHS Publication No. SMA 01-3499, Analytic Series A-12). Rockville, MD: Substance Abuse and Mental Health Services Administration. [Available at http://www.samhsa.gov/oas/analytic.htm]

Longford, N. (1987). A fast scoring algorithm for maximum likelihood estimation in unbalanced models with nested random effects. *Biometrika, 74*, 817-827.

Longford, N. (1993). *Random coefficient models*. Oxford, England: Clarendon.

Newcomb, M. D., Maddahian, E., Bentler, P. M. (1986). Risk factors for drug use among adolescents: Concurrent and longitudinal analysis. *American Journal of Public Health, 76*, 525-531.

Mason, W. M., Wong, G. M., & Entwistle, B. (1983). Contextual analysis through the multilevel linear model. In S. Leinhardt (Ed.), *Sociological methodology* (pp. 72-103). San Francisco, CA: Jossey-Bass.

Merrill, J. C., Kleber, H. D., Shwartz, M., Liu, H., & Lewis, S. R. (1999). Cigarettes, alcohol, marijuana, other risk behaviors, and American youth. *Drug and Alcohol Dependence, 56,* 205-212.

Morris, C. (1995). Hierarchical models for educational data: An overview. *Journal of Educational and Behavioral Statistics, 20*, 190, 200.

Nagelkerke, N. J. D. (1991). Miscellanea: A note on a general definition of the coefficient of determination. *Biometrika*, *78*, 691-692.

Novak, S. P., & Clayton, R. R. (2001). The influence of school environment and self-regulation on transitions between stages of cigarette smoking: A multilevel analysis. *Health Psychology, 20*, 196-207.

Office of Applied Studies. (2000). *Summary of findings from the 1999 National Household Survey on Drug Abuse* (DHHS Publication No. SMA 00-3466, NHSDA Series H-12). Rockville, MD: Substance Abuse and Mental Health Services Administration. [Available at http://www.samhsa.gov/oas/nhsda.htm]

Office of Applied Studies. (2001). *Summary of findings from the 2000 National Household Survey on Drug Abuse* (DHHS Publication No. SMA 01-3549, NHSDA Series H-13). Rockville, MD: Substance Abuse and Mental Health Services Administration. [Available at http://www.samhsa.gov/oas/nhsda.htm]

Office of Applied Studies. (2002a). *Results from the 2001 National Household Survey on Drug Abuse: Volume I. Summary of national findings* (DHHS Publication No. SMA 02-3758, NHSDA Series H-17). Rockville, MD: Substance Abuse and Mental Health Services Administration. [Available at http://www.samhsa.gov/oas/nhsda.htm]

Office of Applied Studies. (2002b). *Results from the 2001 National Household Survey on Drug Abuse: Volume II. Technical appendices and selected data tables* (DHHS Publication No. SMA 02-3759, NHSDA Series H-18). Rockville, MD: Substance Abuse and Mental Health Services Administration. [Available at http://www.samhsa.gov/oas/nhsda.htm]

Petraitis, J., Flay, B. R., Miller, T. Q., Torpy, E. J., & Greiner, B. (1998). Illicit substance use among adolescents: A matrix of prospective predictors. *Substance Use and Misuse*, *33*, 2561-2604.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (Advanced Quantitative Techniques in the Social Sciences Series, Vol. 1, 2nd ed.). Thousand Oaks, CA: Sage Publications.

Rodriguez, G., & Goldman, N. (1995). An assessment of estimation procedures for multilevel models with binary responses. *Journal of the Royal Statistical Society, A-158*, 73-90.

Rosenberg, B. (1973). Linear regression with randomly dispersed parameters. *Biometrika, 60*, 61-75.

Shah, B. V., Barnwell, B. G., & Bieler, G. S. (1998). *SUDAAN user's manual: Version 7.5*. Research Triangle Park, NC: RTI.

Singer, J. D. (1998). Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models. *Journal of Educational and Behavioral Statistics, 23*, 323-355.

Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Thousand Oaks, CA: Sage Publications.

U.S. Department of Commerce, Bureau of the Census. (2001). *School enrollment and economic characteristics of students: October 1999. Detailed tables for Current Population Report (P20 - 533), Table 2*. Retrieved January 28, 2002, from http://www.census.gov/population/www/socdemo/school/p20-533.html

Wright, D., & Zhang, Z. (1999, August). *Do people, family, and neighborhood all matter in an individual's chances of illicit drug use?* Paper presented at the Joint Statistical Meeting, Baltimore, MD.

Appendix A: Directory of Prevention Domains, Constructs, and Items Used from the 1999 NHSDA Questionnaire

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Table A.1 List of Items in the *Community Domain* from the 1999 NHSDA

Construct	Factor	Item #	Item
Community Disorganization and Crime	Risk		*How Much Do You Agree or Disagree That...*
		YE-2a	...there is a lot of crime in your neighborhood? ● Strongly agree ● Somewhat agree ● Somewhat disagree ● Strongly disagree
		YE-2b	...there is a lot of drug selling in your neighborhood? (see previous response categories)
		YE-2g	...there are a lot of street fights in your neighborhood? (see previous response categories)
		YE-2h	...there are many empty or abandoned buildings in your neighborhood? (see previous response categories)
		YE-2j	...there is a lot of graffiti in your neighborhood? (see previous response categories)
		YE-2l	...people move in and out of your neighborhood often? (see previous response categories)
Neighborhood Cohesiveness	Protective		*How Much Do You Agree or Disagree That...*
		YE-2c	...people in your neighborhood often help each other out? ● Strongly agree ● Somewhat agree ● Somewhat disagree ● Strongly disagree
		YE-2i	...people in your neighborhood often visit each other's homes? (see previous response categories)
Community Attitudes Toward Substance Use	Risk		*How Do You Think That Most Adults in Your Neighborhood Would Feel About...*
		YE-3b	...you trying *marijuana or hashish* once or twice? ● Neither approve nor disapprove ● Somewhat disapprove ● Strongly disapprove
		YE-3a	...you smoking one or two packs of *cigarettes* per day? (see previous response categories)
		YE-3d	...you having one or more drinks of an *alcoholic beverage* nearly every day? (see previous response categories)
Community Norms Toward Substance Use	Risk		*How Many Adults That You Know Personally Would You Say....*
		YE-5b	...use *marijuana or hashish*? ● None of them ● A few of them ● Most of them ● All of them
		YE-5a	...smoke *cigarettes*? (see previous response categories)
		YE-5c	...drink *alcoholic beverages*? (see previous response categories)
		YE-5d	... *get drunk* at least once a week? (see previous response categories)

Table A.1 (continued)

Construct	Factor	Item #	Item
Availability of Drugs	Risk		*How Difficult or Easy Would it Be for You to Get Some [Name of Substance], if You Wanted Some?*
		R-2a	Marijuana • Probably impossible • Very difficult • Fairly difficult • Fairly easy • Very easy
		R-2b	LSD (see previous response categories)
		R-2c	Cocaine (see previous response categories)
		R-2d	Crack (see previous response categories)
		R-2e	Heroin (see previous response categories)
Exposure to Prevention Messages in the Media	Protective	YE-25	*During the past 12 Months, Have You Seen or Heard Any Alcohol or Drug Prevention Messages from Sources Outside School, Such as in Posters, Pamphlets, and Radio or TV Ads?* • Yes • No

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table A.2 List of Items in the *Family Domain* from the 1999 NHSDA

Construct	Factor	Item #	Item
Parental Monitoring	Risk		*How Often During the Past 12 Months Did Your Parents...*
		YE-6a	...check on whether you had done your homework? • Always • Sometimes • Seldom • Never
		YE-6b	...provide help with your homework when you needed it? (see previous response categories)
		YE-6c	...make you do work or chores around the house? (see previous response categories)
		YE-6d	...limit the amount of time you watched TV? (see previous response categories)
		YE-6e	...limit the amount of time you went out with friends on school nights? (see previous response categories)
Parental Encouragement	Protective		*How Often During the Past 12 Months Did Your Parents...*
		YE-6f	...let you know when you'd done a good job? • Always • Sometimes • Seldom • Never
		YE-6g	...tell you they're proud of you for something you'd done? (see previous response categories)
Parent's Attitude Toward Substance Use	Risk		*How Do You Think Your Parents Would Feel about You...*
		YE-7b	...trying *marijuana or hashish* once or twice? • Neither approve nor disapprove • Somewhat disapprove • Strongly disapprove
		YE-7a	...smoking one or two packs of *cigarettes* per day? (see previous response categories)
		YE -7d	...having one or more drinks of an *alcoholic beverage* nearly every day? (see previous response categories)
Parents Communicate About Substance Use	Protective	YE-8	*During the Past 12 Months, Have You Talked with at Least One of Your Parents about the Dangers of Tobacco, Alcohol, or Drug Use?* • Yes • No

Table A.2 (continued)

Construct	Factor	Item #	Item
Parents Are Source of Social Support	Protective	YE-22	*If You Wanted to Talk to Someone about a Serious Problem, Which of the Following People Would You Turn To? Please Mark All That Apply.* • Nobody • Your mother • Your father • Your grandmother or grandfather • Your boyfriend or girlfriend • Your brother or sister • Some other relative • A friend • A neighbor • A teacher, principal, coach, or school counselor • A therapist, psychiatrist, or other private counselor • A pastor, clergy or church group • Other (Scored as parents (mother or father) vs. other responses)

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table A.3 List of Items in the *Peer/Individual Domain* from the 1999 NHSDA

Construct	Factor	Item #	Item
Antisocial Behavior	Risk		*During the Past 12 Months, How Many Times Have You...*
		YE-18b	...gotten into a serious fight at school or at work? ● 0 ● 1 or 2 times ● 3 to 5 times ● 6 to 9 times ● 10 or more times
		YE-18c	...taken part in a fight where a group of your friends fought against another group? (see previous response categories)
		YE-18d	...carried a handgun? (see previous response categories)
		YE-18e	...sold illegal drugs? (see previous response categories)
		YE-18f	...stolen or tried to steal anything worth more than $50? (see previous response categories)
		YE-18g	...attacked someone with the intent to seriously hurt them? (see previous response categories)
Individual Attitudes Toward Substance Use	Risk		*How Do You Feel about Someone Your Age...*
		YE-19b	....trying *marijuana or hashish* once or twice? ● Neither approve nor disapprove ● Somewhat disapprove ● Strongly disapprove
		YE-19a	...smoking one or two packs of *cigarettes* per day? (see previous response categories)
		YE-19d	...having one or more drinks of an *alcoholic beverage* nearly every day? (see previous response categories)
Friends' Attitudes Toward Substance Use	Risk		*How Do You Think Your Close Friends Would Feel about You...*
		YE-20b	...trying *marijuana or hashish* once or twice? ● Neither approve nor disapprove ● Somewhat disapprove ● Strongly disapprove
		YE-20a	...smoking one or two packs of *cigarettes* per day? (see previous response categories)
		YE -20d	...having one or more drinks of an *alcoholic beverage* nearly every day? (see previous response categories)
Friends' Substance Use	Risk		*How Many of Your Friends Would You Say...*
		YE-21b	...use marijuana or hashish? ● None of them ● A few of them ● Most of them ● All of them
		YE-21a	...smoke cigarettes? (see previous response categories)
		YE-21c	...drink alcoholic beverages? (see previous response categories)
		YE-21d	...get drunk at least once a week? (see previous response categories)

Table A.3 (continued)

Construct	Factor	Item #	Item
Perceived Risk of Substance Use	Risk		*How Much Do You Think People Risk Harming Themselves Physically and in Other Ways When They...*
		R-1b	...smoke marijuana once a month? • No risk • Slight risk • Moderate risk • Great risk
		R-1c	...smoke marijuana once or twice a week? (see previous response categories)
		R-1a	...smoke one or more packs of cigarettes per day? (see previous response categories)
		R-1j	...have four or five drinks nearly every day? (see previous response categories)
		R-1k	...have five or more drinks once or twice a week? (see previous response categories)
Risk-Taking Proclivity	Risk	R-4a	*How Often Do You Get a Real Kick out of Doing Things That Are a Little Dangerous?* • Never • Seldom • Sometimes • Always
		R-4b	*How Often Do You Test Yourself by Doing Something a Little Risky?* (see previous response categories)
		R-4c	*How Often Do You Wear a Seatbelt When You Are Riding in the Front Passenger Seat of a Car?* (see previous response categories)

Table A.3 (continued)

Construct	Factor	Item #	Item
Participation in Extracurricular Activities	Protective	YE-23	*In the Past 12 Months, Have You Participated in...* ● ...Big Brother/Big Sister/Big Buddy program or peer mentoring or tutoring program? ● ...a problem solving, communication skills or self-esteem group? ● ...a violence prevention program, where you learn ways to avoid fights and control anger? ● ...youth center activities, at the YMCA, YWCA, or other similar community center? ● ...the Boy Scouts or Girl Scouts? ● ...private lessons, such as piano, dance, tennis, karate, horseback riding, etc? ● ...an alcohol, tobacco, or drug prevention program *outside of school*, where you learn about the dangers of using, and how to resist using, alcohol, tobacco, or drugs? ● ...team sports, such as football, basketball, swimming, gymnastics, etc.? ● ...a 4-H club? ● ...a program or meeting to help you deal with drug or alcohol use by you or another member of your family, such as AA, Alateen, or individual or group counseling? ● ...a school band, orchestra, or choir? ● ...school-related clubs? ● ...volunteer or community work, such as recycling or clean-up projects? ● ...student government? ● ...pregnancy or sexually transmitted disease prevention programs? ● ...job skills or job training? ● ...a church choir? (Scored as two or more activities vs. less than two activities)
Religiosity	Protective	D-41	*During the Past 12 Months, How Many Times Did You Attend Religious Services? Please Do Not Include Special Occasions Such as Weddings, Christenings, Funerals, or Other Special Events in Your Answer.* ● 0 to 5 times ● 6 to 24 times ● 25 to 52 times ● More than 52 times
		D-42a	*My Religious Beliefs Are a Very Important Part of My Life.* ● Strongly disagree ● Disagree ● Agree ● Strongly agree
		D-42b	*My Religious Beliefs Influence How I Make Decisions in My Life.* (see previous response categories)
		D-42c	*It Is Important That My Friends Share My Religious Beliefs.* (see previous response categories)

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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Table A.4 List of Items in the *School Domain* from the 1999 NHSDA

Construct	Factor	Item #	Item
Commitment to School	Protective	YE-10	*Please Choose the Option That Best Describes How You Felt Overall about Going to School During the Past 12 Months.* ● You liked going to school ● You kind of liked going to school ● You didn't like going to school ● You hated going to school
		YE-11	*During the Past 12 Months, How Often Did You Feel That the School Work You Were Assigned to Do Was Meaningful and Important?* ● You always felt this way ● You sometimes felt this way ● You seldom felt this way ● You never felt this way
		YE-12	*How Important Do You Think the Things You Have Learned in School During the Past 12 Months Are Going to Be to You Later in Life?* ● Very important ● Somewhat important ● Somewhat unimportant ● Very unimportant
		YE-13	*How Interesting Do You Think Most of Your Courses at School During the Past 12 Months Have Been?* ● Very interesting ● Somewhat interesting ● Somewhat boring ● Very boring
Sanctions Against Substance Use	Protective		*How Much Trouble Do You Think a Student in Your Grade Would Be in If He or She Got Caught at School...*
		YE-17f	...using an illegal drug? ● A lot of trouble ● A little trouble ● No trouble at all
		YE-17b	...smoking a cigarette? (see previous response categories)
		YE-17d	...drinking an alcoholic beverage? (see previous response categories)
Perceived Prevalence of Substance Use	Risk		*How Many of the Students in Your Grade at School Would You Say...*
		YE-16b	...use marijuana or hashish? ● None ● A few ● Most ● All
		YE-16a	...smoke cigarettes? (see previous response categories)
		YE-16c	...drink alcoholic beverages? (see previous response categories)
		YE-16d	...get drunk at least once a week? (see previous response categories)
Academic Performance	Risk	YE-15	*What Were Your Grades for the Last Semester or Grading Period That You Completed?* ● A+, A, or A-minus average ● B+, B, or B-minus average ● C+, C, or C-minus average ● D or less than a D average

Table A.4 (continued)

Construct	Factor	Item #	Item
Exposure to Prevention Messages in School	Protective	YE-24	*In the Past 12 Months, Have You Had...* ● ...a special class about drugs or alcohol? (Yes or No) ● ...films, lectures, discussions, or printed information about drugs or alcohol *in* one of your regular classes, such as health, physical education, etc.? (Yes or No) ● ...films, lectures, discussions, or printed information about drugs or alcohol *outside* one of your regular classes, such as in special assemblies? (Yes or No) (Scored as "Yes" to at least one of the above vs. "No" to all of the above)

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table A.5 Distribution of Items in the *Community Domain* from the 1999 NHSDA

Construct	Percent	Construct	Percent
Community Disorganization and Crime			
A Lot of Crime in Neighborhood		Many Empty / Abandoned Buildings in Neighborhood	
Strongly disagree	51.6	Strongly disagree	75.5
Somewhat disagree	26.2	Somewhat disagree	13.4
Somewhat agree	17.0	Somewhat agree	7.3
Strongly agree	5.1	Strongly agree	3.8
A Lot of Drug Selling in Neighborhood		A Lot of Graffiti in Neighborhood	
Strongly disagree	56.9	Strongly disagree	69.9
Somewhat disagree	18.3	Somewhat disagree	14.7
Somewhat agree	15.6	Somewhat agree	10.3
Strongly agree	9.1	Strongly agree	5.0
A Lot of Street Fights in Neighborhood		People Move In and Out of Neighborhood Often	
Strongly disagree	69.7	Strongly disagree	38.1
Somewhat disagree	16.2	Somewhat disagree	31.5
Somewhat agree	9.6	Somewhat agree	22.3
Strongly agree	4.5	Strongly agree	8.2
Neighborhood Cohesiveness			
People in Neighborhood Often Help Each Other Out		People in Neighborhood Often Visit Each Other's Homes	
Strongly disagree	7.5	Strongly disagree	10.2
Somewhat disagree	14.1	Somewhat disagree	16.8
Somewhat agree	45.1	Somewhat agree	41.5
Strongly agree	33.4	Strongly agree	31.4
Community Attitudes Toward Substance Use			
Marijuana (Trying Once or Twice)		Alcohol (1 or More Drinks Nearly Every Day)	
Strongly disapprove	78.8	Strongly disapprove	70.3
Somewhat disapprove / Neither approve nor disapprove	21.1	Somewhat disapprove / Neither approve nor disapprove	29.8
Cigarettes (1 or 2 Packs a Day)			
Strongly disapprove	65.1		
Somewhat disapprove / Neither approve nor disapprove	34.8		
Community Norms Toward Substance Use			
How many adults that you know personally would you say use the following substances?			
Marijuana		Alcohol	
None of them	71.2	None of them	12.6
A few of them	25.0	A few of them	42.2
Most / All of them	3.8	Most / All of them	45.2
Cigarettes		Get Drunk at Least Once a Week	
None of them	10.9	None of them	55.0
A few of them	60.8	A few of them	37.6
Most of them / All of them	28.3	Most / All of them	7.5

Table A.5 (continued)

Construct	Percent	Construct	Percent
Availability of Drugs			
Marijuana		Crack	
Probably impossible / Very difficult / Fairly difficult	43.5	Probably impossible / Very difficult / Fairly difficult	71.6
Fairly easy / Very easy	56.5	Fairly easy / Very easy	28.4
LSD		Heroin	
Probably impossible / Very difficult / Fairly difficult	75.1	Probably impossible / Very difficult / Fairly difficult	81.9
Fairly easy / Very easy	24.9	Fairly easy / Very easy	18.1
Cocaine			
Probably impossible / Very difficult / Fairly difficult	82.5		
Fairly easy / Very easy	27.5		
Exposure to Prevention Messages in the Media			
No	17.7		
Yes	82.3		

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table A.6 Distribution of Items in the *Family Domain* from the 1999 NHSDA

Construct	Percent	Construct	Percent
Parental Monitoring			
Parents Check on Whether Done Homework		Parents Limit the Amount of Time You Watch TV	
Never	8.4	Never	38.7
Seldom	13.7	Seldom	22.1
Sometimes	32.6	Sometimes	27.9
Always	45.3	Always	11.3
		Parents Limit Amount of Time Out with Friends on School Nights	
Parents Provide Help With Homework if Needed			
Never	81.1	Never	12.6
Seldom	10.8	Seldom	15.6
Sometimes	23.7	Sometimes	30.0
Always	57.3	Always	41.9
Parents Make You Do Work Chores Around the House			
Never	3.1		
Seldom	8.9		
Sometimes	36.7		
Always	51.3		
Parental Encouragement			
		Parents Tell You They Are Proud of You for Something You Have Done	
Parents Let You Know You Have Done a Good Job			
Never	4.1	Never	4.2
Seldom	10.2	Seldom	10.5
Sometimes	33.7	Sometimes	32.2
Always	52.0	Always	53.1
Parents' Attitudes Toward Substance Use			
Marijuana (Trying Once or Twice)		Alcohol (1 or More Drinks Nearly Every Day)	
Strongly disapprove	90.7	Strongly disapprove	89.5
Somewhat disapprove / Neither approve nor disapprove	9.2	Somewhat disapprove / Neither approve nor disapprove	10.5
Cigarettes (1 or 2 Packs a Day)			
Strongly disapprove	87.4		
Somewhat disapprove / Neither approve nor disapprove	12.6		
Parents Communicate About Substance Use			
No	42.6		
Yes	57.4		
Parents as Source of Social Support			
Selected mother or father	71.7		
Did not select mother or father	28.3		

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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Table A.7 Distribution of Items in the *Peer/Individual Domain* from the 1999 NHSDA

Construct	Percent	Construct	Percent
Antisocial Behavior			
Got into a Serious Fight at School or Work		Sold Illegal Drugs	
0 times	78.1	0 times	96.2
1 or more times	21.9	1 or more times	3.8
Taken Part in Group on Group Fight		Stole / Tried to Steal Anything Worth More than $50	
0 times	82.9	0 times	95.2
1 or more times	17.1	1 or more times	4.7
Carried a Handgun		Attacked Someone with Intent to Seriously Hurt Them	
0 times	96.4	0 times	91.6
1 or more times	3.6	1 or more times	8.4
Individual Attitudes Toward Substance Use			
Marijuana (Trying once or twice)		Alcohol (1 or More Drinks Nearly Every Day)	
Strongly disapprove	63.5	Strongly disapprove	63.4
Somewhat disapprove / Neither approve nor disapprove	36.4	Somewhat disapprove / Neither approve nor disapprove	36.6
Cigarettes (1 or 2 Packs a Day)			
Strongly disapprove	63.7		
Somewhat disapprove / Neither approve nor disapprove	36.3		
Friends' Attitudes Toward Substance Use			
Marijuana		Alcohol (1 or More Drinks Nearly Every Day)	
Strongly disapprove	63.2	Strongly disapprove	59.6
Somewhat disapprove / Neither approve nor disapprove	36.8	Somewhat disapprove / Neither approve nor disapprove	40.4
Cigarettes (1 or 2 Packs a Day)			
Strongly disapprove	57.5		
Somewhat disapprove / Neither approve nor disapprove	42.6		
Friends' Substance Use			
Marijuana		Alcohol	
None of them	58.0	None of them	39.4
A few of them	30.3	A few of them	37.7
Most / All of them	11.7	Most / All of them	23.0
Cigarettes		Get Drunk at Least Once a Week	
None of them	37.9	None of them	63.4
A few of them	43.4	A few of them	27.8
Most of them / All of them	18.7	Most / All of them	8.8

Table A.7 (continued)

Construct	Percent	Construct	Percent
Risk-Taking Proclivity			
How often do you get a real kick out of doing things that are a little dangerous?		How often do you wear a seatbelt when you are riding in the front passenger seat of a car?	
Never	28.7	Never	4.9
Seldom	30.9	Seldom	9.3
Sometimes	33.1	Sometimes	23.1
Always	7.4	Always	62.7
How often do you test yourself by doing something a little risky?			
Never	29.8		
Seldom	36.7		
Sometimes	28.1		
Always	5.4		
Perceived Risk of Substance Use			
Marijuana (Once a Month)		Alcohol (4 or 5 Drinks Nearly Every day)	
Great risk	37.2	Great risk	63.6
No risk / Slight risk / Moderate risk	62.8	No risk / Slight risk / Moderate risk	36.4
Marijuana (1 or 2 Times a Week)		Alcohol (5 or More Drinks 1 or 2 Times a Week)	
Great risk	56.5	Great risk	42.0
No risk / Slight risk / Moderate risk	43.5	No risk / Slight risk / Moderate risk	58.0
Cigarettes (1 or More Packs a Day)			
Great risk	60.7		
No risk / Slight risk / Moderate risk	39.3		
Involvement in Extracurricular Activities			
Participated in 0 or 1 activities	30.9		
Participated in 2 or more activities	69.1		
Religiosity			
Number of Times Attended Religious Services in Past 12 Months		Religious Beliefs Influence How Make Decisions in Life	
0 to 5	40.8	Strongly disagree	7.5
6 to 24	17.4	Somewhat disagree	19.9
25 to 52	20.2	Somewhat agree	44.8
More than 52	21.7	Strongly agree	27.9
Religious Beliefs a Very Important Part of Life		It is Important That Friends Share My Religious Beliefs	
Strongly disagree	7.2	Strongly disagree	19.0
Somewhat disagree	12.6	Somewhat disagree	44.3
Somewhat agree	44.3	Somewhat agree	27.2
Strongly agree	36.0	Strongly agree	9.4

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table A.8 Distribution of Items in the *School Domain* from the 1999 NHSDA

Construct	Percent	Construct	Percent
Commitment to School			
During the past 12 months...			
		How important do you think the things you have learned in school are going to be to you later in life?	
How did you feel overall about going to school?			
Hated going to school	6.1	Very unimportant	3.2
Didn't like going to school	13.7	Somewhat unimportant	10.6
Kind of liked going to school	48.4	Somewhat important	41.4
Liked going to school	31.8	Very important	44.8
How often did you feel that the school work you were assigned to do was meaningful and important?		How interesting do you think most of your courses at school have been?	
Never	4.7	Very boring	6.3
Seldom	17.3	Somewhat boring	18.8
Sometimes	52.5	Somewhat interesting	53.0
Always	25.5	Very interesting	21.9
Sanctions Against Substance Use at School			
How much trouble if caught using an illegal drug?		How much trouble if caught drinking alcohol?	
No trouble at all	1.0	No trouble at all	1.3
A little trouble	3.9	A little trouble	12.9
A lot of trouble	95.1	A lot of trouble	85.7
How much trouble if caught smoking a cigarette?			
No trouble at all	4.4		
A little trouble	32.8		
A lot of trouble	62.8		
Perceived Prevalence of Substance Use			
How many students in your grade at school would you say use the following substances?			
Marijuana		Alcohol	
None of them	26.1	None of them	18.0
A few of them	50.6	A few of them	40.8
Most / All of them	23.4	Most / All of them	41.2
Cigarettes		Get Drunk at Least Once a Week	
None of them	13.3	None of them	35.5
A few of them	46.7	A few of them	47.2
Most of them / All of them	40.0	Most / All of them	17.3
Academic Performance			
What were your grades in last completed semester/grading period?			
A+ / A / A-	28.5		
B+ / B / B-	41.5		
C+ / C / C-	22.2		
D or below	5.9		
School does not give letter grades	2.0		
Exposure to Prevention Messages in School			
No	77.4		
Yes	22.6		

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table A.9 Correlations among *Risk Factor Scales* for Youths Aged 12 to 17: 1999

Risk Factor Scale	Community Disorgani- zation and Crime	Com- munity Attitudes	Com- munity Norms	Perceived Avail- ability of Marijuana	Parental Monitoring	Parental Attitudes	Anti- social Behavior	Individ- ual Attitudes	Friends' Attitudes	Friends' Use	Perceived Risk of Use	Risk- Taking Proclivity	Perceived Prevalence in School	Aca- demic Per- formance
Community Disorganization and Crime	--	0.28	0.24	0.14	0.08	0.15	0.22	0.13	0.15	0.17	0.10	0.09	0.13	0.17
Community Attitudes	--	--	0.26	0.22	0.21	0.34	0.20	0.35	0.35	0.29	0.25	0.16	0.25	0.18
Community Norms	--	--	--	0.34	0.26	0.23	0.29	0.34	0.37	0.50	0.29	0.31	0.44	0.22
Perceived Availability of Marijuana	--	--	--	--	0.25	0.11	0.19	0.34	0.37	0.51	0.23	0.32	0.55	0.12
Parental Monitoring	--	--	--	--	--	0.17	0.18	0.27	0.29	0.32	0.22	0.25	0.30	0.14
Parental Attitudes	--	--	--	--	--	--	0.24	0.41	0.37	0.25	0.26	0.15	0.15	0.16
Antisocial Behavior	--	--	--	--	--	--	--	0.29	0.28	0.35	0.27	0.33	0.23	0.25
Individual Attitudes	--	--	--	--	--	--	--	--	0.70	0.50	0.45	0.38	0.36	0.25
Friends' Attitudes	--	--	--	--	--	--	--	--	--	0.57	0.42	0.36	0.41	0.26
Friends' Use	--	--	--	--	--	--	--	--	--	--	0.36	0.39	0.67	0.25
Perceived Risk of Use	--	--	--	--	--	--	--	--	--	--	--	0.30	0.23	0.21
Risk-Taking Proclivity	--	--	--	--	--	--	--	--	--	--	--	--	0.29	0.19
Perceived Prevalence	--	--	--	--	--	--	--	--	--	--	--	--	--	0.18
Academic Performance	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: All correlations are significant at *p* < .0001.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table A.10 Correlations among *Protective Factor Scales* for Youths Aged 12 to 17: 1999

Protective Factor Scale	Neighbor-hood Cohesive-ness	Exposed to Prevention Messages in Media	Parental Encourage-ment	Parents Communicate About Substance Abuse	Parents Are Source of Social Support	Participation in Two or More Extracurricular Activities	Religiosity	Commitment to School	School Has Sanctions Against Substance Use	Exposed to Prevention Messages in School
Neighborhood Cohesiveness	--	0.06	0.16	0.10	0.08	0.16	0.12	0.13	0.10	0.09
Exposed to Prevention Messages in Media	--	--	0.07	0.12	0.05	0.15	0.06	0.07	0.07	0.25
Parental Encouragement	--	--	--	0.24	0.33	0.15	0.17	0.29	0.16	0.10
Parents Communicate About Substance Abuse	--	--	--	--	0.20	0.14	0.08	0.14	0.07	0.16
Parents Are Source of Social Support	--	--	--	--	--	0.07	0.10	0.21	0.13	0.07
Participation in Two or More Extracurricular Activities	--	--	--	--	--	--	0.19	0.16	0.07	0.21
Religiosity	--	--	--	--	--	--	--	0.20	0.11	0.06
Commitment to School	--	--	--	--	--	--		--	0.21	0.09
School Has Sanctions Against Substance Use	--	--	--	--	--	--	--	--	--	0.10
Exposed to Prevention Messages in School	--	--	--	--	--	--	--	--	--	--

Note: All correlations are significant at $p < .0001$.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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Table A.11 Correlations Between Risk Factor Scales and Protective Factor Scales for Youths Aged 12 to 17: 1999

Protective Factor Scale	Community Disorgani- zation and Crime	Com- munity Attitudes	Com- munity Norms	Perceived Avail- ability of Marijuana	Parental Monitoring	Parental Attitudes	Anti- social Behavior	Individ- ual Attitudes	Friends' Attitudes	Friends' Use	Perceived Risk of Use	Risk- Taking Proclivity	Perceived Prevalence in School	Academic Per- formance
Neighborhood Cohesiveness	-0.16	-0.25	-0.11	-0.09	-0.16	-0.08	-0.07	-0.12	-0.14	-0.10	-0.09	-0.05	-0.10	-0.14
Exposed to Prevention Messages in Media	-0.07	-0.09	-0.05	0.01	-0.07	-0.14	-0.10	-0.09	-0.08	-0.07	-0.08	-0.05	-0.03	-0.12
Parental Encouragement	-0.11	-0.16	-0.22	-0.17	-0.43	-0.13	-0.18	-0.23	-0.24	-0.24	-0.17	-0.21	-0.22	-0.20
Parents Communicate About Substance Abuse	-0.06	-0.08	-0.07	-0.02	-0.24	-0.07	-0.06	-0.10	-0.10	-0.07	-0.09	-0.09	-0.06	-0.12
Parents Are Source of Social Support	-0.08	-0.12	-0.16	-0.17	-0.24	-0.10	-0.16	-0.22	-0.20	-0.22	-0.15	-0.20	-0.19	-0.13
Participation in Two or More Extracurricular Activities	-0.11	-0.17	-0.14	-0.07	-0.16	-0.14	-0.11	-0.19	-0.21	-0.16	-0.16	-0.09	-0.10	-0.28
Religiosity	-0.06	-0.15	-0.23	-0.17	-0.23	-0.16	-0.13	-0.28	-0.25	-0.23	-0.23	-0.17	-0.17	-0.16
Commitment to School	-0.04	-0.15	-0.24	-0.24	-0.31	-0.10	-0.24	-0.33	-0.32	-0.31	-0.26	-0.37	-0.27	-0.27
School Has Sanctions Against Substance Use	-0.11	-0.20	-0.18	-0.28	-0.23	-0.16	-0.20	-0.22	-0.24	-0.30	-0.18	-0.17	-0.35	-0.08
Exposed to Prevention Messages in School	-0.06	-0.11	-0.05	-0.04	-0.11	-0.13	-0.08	-0.10	-0.11	-0.09	-0.10	-0.05	-0.06	-0.14

Note: All correlations are significant at $p < .0001$, except Perceived Easy Availability of Marijuana and Exposed to Prevention Messages in Media ($p = .4861$), Perceived Easy Availability of Marijuana and Parents Communicate About Substance Abuse ($p = .0015$).

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1999.

Appendix B: Discussion of Missing Values for School Domain Factors

Appendix B: Discussion of Missing Values for School Domain Factors

As mentioned in Chapter 2, the 1999 National Household Survey on Drug Abuse (NHSDA) computer-assisted interviewing (CAI) data contained a large number of missing values for questions related to youths' experiences and beliefs about school. The 1999 NHSDA CAI questionnaire was completed by 25,357 youths aged 12 to 17, and the questions regarding school had between 6,000 and 7,000 missing values, representing approximately 25 percent of the youth sample (see Table 2.4 for sample sizes for the school factors). The principal reason for these missing data are that only 19,306 of the 25,357 youths—or 76.1 percent—answered "yes" to the following survey question: "Have you been enrolled in any type of school at any time during the past 12 months." Although some percentage of these youths who did not answer "yes" did so because they truly were not enrolled in school during the past 12 months, a comparison with other national estimates suggests that the 1999 NHSDA CAI estimate of the percentage of youths enrolled in school is too small. The Current Population Survey (CPS) report published by the U.S. Bureau of the Census estimated that 96.9 percent of youths aged 12 to 17 were enrolled in public or private schools in October 1999 (U.S. Department of Commerce, 1999). It is possible that some of the missing values could be due to youths who attended home schools. However, the 1999 National Household Education Survey estimated that only 1.7 percent of youths under the age of 17 attended home schools (Bielick, Chandler, & Broughman, 2001).

Given these other national estimates, it is likely that many youths who did not answer "yes" to the school enrollment questions in the 1999 NHSDA CAI questionnaire had in fact been enrolled in school during the past 12 months. One possible cause for these errors is that some youths (especially younger ones) might not have understood what it meant to be "enrolled in school." A second possibility is that some youths who were interviewed during summer vacation may have answered "no" to the enrollment question because they were not currently attending school. These errors, in combination with "skip patterns" that were programmed into the computer- assisted interview, are the principal reasons for the large number of missing values for the school domain factors. CAI techniques allow for the programming of skip patterns, in which questions judged to be irrelevant for a respondent based on his or her answers to previous questions are not presented to the respondent. For example, if a respondent has previously identified himself as a male, the computer-assisted interview could be programmed to skip subsequent questions related to experiences with pregnancy for that respondent. For the 1999 NHSDA CAI data, the computer-assisted interview was programmed so that only youths who answered "yes" to the question about school enrollment were presented with the other questions related to school. Because of this, only the 76.1 percent of youths who answered "yes" to the school enrollment question provided data for school domain questions.

Due to these issues, any analyses that include items from the school domain are only possible for the subset of youths who correctly answered the question about school enrollment. The effect of this can be seen in the smaller sample sizes for the school domain factors listed in Table 2.4 compared with the sample sizes listed for the other domains in Tables 2.1 through 2.3 (see Chapter 2).[32] This also affected the sample size of the final prediction models presented in Chapter 4. In those models, an observation that had a missing value for any of the covariates was dropped from the analyses. The inclusion of items from the school domain resulted in a reduction of the sample size for these models. For example, the final model for past year marijuana use included 16,411 of the 25,357 youths who completed the 1999 NHSDA CAI questionnaire (see Table 4.6 in Chapter 4).

If the responses of the subset of youths who answered "yes" to the school enrollment question differed from the responses for the full sample of youths, any results relating to the school variables could be biased. To determine whether the estimates of school-related questions for the responding subsample of youths were biased, some of the analyses involving the school domain factors were repeated using an adjusted set of sample weights. These adjusted weights were based on the population demographic characteristics of youths by age, race/ethnicity, and gender.

Table B.1 presents the descriptive statistics for each risk and protective factor in the school domain, using the adjusted sample weights. These results were very consistent with the descriptive statistics computed using the original sample weights (see Table 2.4 in Chapter 2). None of the mean values for the continuous predictors differed by more than 0.04, and none of the percentages for the categorical factors differed by more than 0.04 percent. Table B.2 presents the means for continuous factors or percentages for categorical factors, using the adjusted sample weights, by race/ethnicity, gender, and age group. Again, the results were very similar to the means or percentages computed using the original sample weights (see Table 2.8 in Chapter 2).

Table B.3 presents the simple odds ratios (ORs) with past year marijuana use for each of the school domain factors. These ORs are very similar to those that were computed using the original sample weights (see Table 3.5 in Chapter 3). None of the ORs differed by more than 0.09. Table B.4 presents these simple ORs with past year marijuana use using the adjusted sample weights, by race/ethnicity, gender, and age group. These ORs were also very similar to those computed using the original sample weights (see Table 3.10 in Chapter 3). Finally, Table

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[32] The family domain risk factor "low parental monitoring" contains questions about whether parents check on whether youths complete their homework and whether parents help youths with their homework when needed. The skip pattern for answering "no" to the school enrollment question included these items, which explains why the sample size for this factor is similar to the sample size for the school domain factors.

B.5 presents the ORs for past year marijuana based on the adjusted sample weights, after adjusting for the set of demographic variables. Again, the results were very similar to the ORs computed using the unadjusted sample weights (see Table 3.14 in Chapter 3).

Because the comparison of estimates using the school domain factors indicate that using the adjusted sample weights resulted in minimal differences in the estimated results of school domain risk and protective factors, the analyses presented in this report using the original sample weights are considered to be unbiased.

Table B.1 Means or Percentages, Standard Deviations, and Quartiles of Youths Aged 12 to 17 Reporting School Domain Risk and Protective Factors, Using Adjusted Sample Weights: 1999

School Domain[1]	Risk/ Protective Factors	Number of Items	Sample Size	Scale Range	Mean or Percentage[2]	Standard Deviation	Quartiles 25%	50%	75%	Cronbach's Alpha Reliability[3]
Commitment to School	Protective	4	19,290	1-4[4]	3.07	0.62	2.75	3.25	3.50	0.78
Sanctions Against Substance Use at School	Protective									
Multiple substance scale[5]		3	19,157	1-3[6]	2.80	0.33	2.67	3.00	3.00	0.70
Illegal drugs		1	19,173	1-3[6]	2.94	0.27	3.00	3.00	3.00	-
Cigarettes		1	19,125	1-3[6]	2.61	0.57	2.00	3.00	3.00	-
Alcohol		1	19,139	1-3[6]	2.85	0.39	3.00	3.00	3.00	-
Perceived Prevalence of Substance Use	Risk									
Multiple substance scale[5]		4	18,765	1-4[7]	2.06	0.65	1.50	2.00	2.50	0.89
Marijuana		1	18,488	1-4[7]	1.96	0.74	1.00	2.00	2.00	-
Cigarettes		1	18,888	1-4[7]	2.26	0.72	2.00	2.00	3.00	-
Alcohol		2	18,229	1-4[7]	2.01	0.71	1.50	2.00	2.50	0.83
Academic Performance	Risk	1	18,976	-		-	-	-	-	-
A+/A/A-					28.5%	0.48				
B+/B/B-					41.3%	0.49				
C+/C/C-					22.2%	0.41				
D/less than D average					5.9%	0.22				
School does not give such grade					2.1%	0.14				
Exposed to Prevention Messages in School	Protective	3	19,024	-	Yes = 77.8%	0.38	-	-	-	-

[1] Specific questions and distributions for school domain constructs are presented in Tables A.4 and A.8 (see Appendix A).
[2] Means are given for continuous variables, and percentages are given for categorical variables (marked with a percent sign).
[3] Cronbach's alpha is a measure of the internal consistency of the individual items used to create multiple-item scales and is a function of the average intercorrelation between the items as well as the number of items. Cronbach's alpha values range from 0 (no correlation between items) and 1 (perfect correlation between items).
[4] Response options for overall feelings toward school were 1 = Hated going to school, 2 = Didn't like going to school, 3 = Kind of liked going to school, and 4 = Liked going to school. Response options for belief about the meaningfulness and importance of school work were 1 = Never, 2 = Seldom, 3 = Sometimes, and 4 = Always. Response options for importance of school work to later life were 1 = Very unimportant, 2 = Somewhat unimportant, 3 = Somewhat important, and 4 = Very important. Response options for interest in courses at school were 1 = Very boring, 2 = Somewhat boring, 3 = Somewhat interesting, and 4 = Very interesting.
[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.
[6] Response options were 1 = Strongly disapprove, 2 = Somewhat disapprove, and 3 = Neither approve nor disapprove.
[7] Response options were 1 = None, 2 = Some, 3 = Most, and 4 = All.
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

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Table B.2   Means or Percentages and Standard Deviations of School Domain Risk and Protective Factors among Youths Aged 12 to 17, by Race/Ethnicity, Gender, and Age, with Adjusted Weights: 1999

School Domain	Race/Ethnicity					Gender			Age in Years		
	Mean or Percentage[1] (Standard Deviation)					Mean or Percentage[1] (Standard Deviation)			Mean or Percentage[1] (Standard Deviation)		
	White	Black	Hispanic	Other[2]	p value[3]	Males	Females	p value[4]	12 - 14	15 - 17	p value[4]
Commitment to School	3.00 (0.61)	3.24 (0.61)	3.21 (0.64)	3.22 (0.58)	<.0001	3.02 (0.64)	3.13 (0.59)	<.0001	3.13 (0.63)	3.01 (0.60)	<.0001
Sanctions Against Substance Use at School											
Multiple substance scale[5]	2.80 (0.31)	2.81 (0.37)	2.80 (0.37)	2.83 (0.31)	.0024	2.80 (0.34)	2.80 (0.32)	.7909	2.89 (0.28)	2.71 (0.34)	<.0001
Illegal drugs	2.95 (0.25)	2.93 (0.32)	2.93 (0.34)	2.96 (0.24)	.0005	2.93 (0.29)	2.94 (0.27)	.0008	2.96 (0.23)	2.92 (0.30)	<.0001
Cigarettes	2.59 (0.55)	2.64 (0.60)	2.64 (0.61)	2.64 (0.61)	<.0001	2.62 (0.57)	2.60 (0.56)	.0810	2.81 (0.45)	2.40 (0.59)	<.0001
Alcohol	2.85 (0.38)	2.84 (0.45)	2.85 (0.43)	2.87 (0.37)	.1252	2.85 (0.40)	2.85 (0.38)	.3714	2.90 (0.34)	2.80 (0.42)	<.0001
Perceived Prevalence of Substance Use											
Multiple substance scale[5]	2.07 (0.62)	2.05 (0.73)	2.05 (0.72)	1.96 (0.70)	.0001	2.01 (0.64)	2.11 (0.65)	<.0001	1.74 (0.61)	2.38 (0.52)	<.0001
Marijuana	1.94 (0.69)	2.03 (0.92)	2.00 (0.83)	1.87 (0.77)	<.0001	1.93 (0.75)	2.00 (0.74)	<.0001	1.64 (0.72)	2.27 (0.64)	<.0001
Cigarettes	2.28 (0.68)	2.26 (0.82)	2.20 (0.79)	2.13 (0.77)	<.0001	2.22 (0.71)	2.34 (0.71)	<.0001	1.99 (0.74)	2.53 (0.60)	<.0001
Alcohol	2.04 (0.68)	1.94 (0.79)	2.00 (0.78)	1.91 (0.77)	<.0001	1.96 (0.71)	2.07 (0.72)	<.0001	1.65 (0.65)	2.37 (0.59)	<.0001

Table B.2 (continued)

School Domain	Race/Ethnicity					Gender			Age in Years		
	Mean or Percentage[1] (Standard Deviation)					Mean or Percentage[1] (Standard Deviation)			Mean or Percentage[1] (Standard Deviation)		
	White	Black	Hispanic	Other[2]	*p* value[3]	Males	Females	*p* value[4]	12 - 14	15 - 17	*p* value[4]
Academic Performance											
A+ / A / A-	32.5%	16.8%	20.6%	41.2%	<.0001	24.0%	34.5%	<.0001	32.8%	25.5%	<.0001
	(0.57)	(1.05)	(1.17)	(2.61)		(0.61)	(0.69)		(0.68)	(0.59)	
B+ / B / B-	42.0%	44.4%	43.0%	37.5%		42.1%	42.4%		41.5%	43.0%	
	(0.56)	(1.35)	(1.40)	(2.34)		(0.65)	(0.69)		(0.70)	(0.62)	
C+ / C / C-	19.9%	32.4%	28.3%	17.8%		26.2%	19.0%		20.3%	25.1%	
	(0.45)	(1.16)	(1.25)	(1.73)		(0.60)	(0.54)		(0.56)	(0.56)	
D / less than D average	5.7%	6.4%	8.1%	3.6%		7.7%	4.2%		5.5%	6.5%	
	(0.25)	(0.61)	(0.70)	(0.82)		(0.35)	(0.26)		(0.33)	(0.31)	
Exposed to Prevention Messages in School	79.1%	73.5%	75.6%	78.8%		74.7%	81.0%	<.0001	81.6%	73.9%	<.0001
	(0.43)	(1.08)	(1.08)	(1.89)		(0.54)	(0.54)		(0.56)	(0.52)	

Note: Care should be taken in interpreting statistically significant differences in this table. With a large sample sizes, very small differences between groups can reach statistical significance.

[1] Means are given for continuous variables, and percentages are given for categorical variables.
[2] Includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, Native Hawaiians or other Pacific Islanders).
[3] *p*-value derived from F-tests for continuous variables and chi-square tests (df = 3) for dichotomous variables.
[4] *p*-values derived from t-tests for continuous variables and chi-square tests (df = 1) for dichotomous variables.
[5] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1999.

Table B.3   Unadjusted Odds Ratios and Confidence Intervals (95 Percent) of School Domain Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17, Using Adjusted Sample Weights: 1999

School Domain[1]	Risk/Protective Factor	Unadjusted OR[2]	p value	95 Percent CI
		Odds of Past Year Marijuana Use		
Commitment to School	Protective	0.45	< .0001	(0.42, 0.48)
Sanctions Against Substance Use at School	Protective			
Multiple substance scale[3]		0.27	< .0001	(0.24, 0.31)
Marijuana		0.51	< .0001	(0.44, 0.58)
Perceived Prevalence of Substance Use	Risk			
Multiple substance scale[3]		6.16	< .0001	(5.59, 6.78)
Marijuana		4.81	< .0001	(4.43, 5.23)
Academic Performance	Risk	1.82	< .0001	(1.72, 1.93)
Exposed to Prevention Messages in School	Protective	0.62	< .0001	(0.56. 0.70)

OR = odds ratio; CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.

[2] ORs are based on separate logistic regression models of past year marijuana use for each of the factors. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. ORs < 1.0 indicate that the odds of past year marijuana use decreased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use. An OR of 4.78 for the perceived prevalence of marijuana risk factor indicates that the odds of past year marijuana use increased 4.78 times with each unit increase in the perceived prevalence of marijuana question.

[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1999.

Table B.4   Unadjusted Odds Ratios and Confidence Intervals (95 Percent) of School Domain Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17, Using Adjusted Sample Weights, by Race/Ethnicity and Gender: 1999

School Domain[2]	Race/Ethnicity								Gender			
	Whites		Blacks		Hispanics		Other[1]		Males		Females	
	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value	OR[3] (95% CI)	p value
Commitment to School	0.43 (0.39, 0.47)	< .0001	0.59 (0.46, 0.74)	< .0001	0.42 (0.34, 0.52)	< .0001	0.33 (0.21, 0.51)	< .0001	0.53 (0.47, 0.58)	< .0001	0.36 (0.32, 0.40)	< .0001
Sanctions Against Substance Use at School												
Multiple substance scale[4]	0.24 (0.21, 0.28)	< .0001	0.38 (0.26, 0.54)	< .0001	0.37 (0.27, 0.50)	< .0001	0.14 (0.07, 0.27)	< .0001	0.27 (0.23, 0.33)	< .0001	0.27 (0.23, 0.33)	< .0001
Illegal drugs	0.46 (0.39, 0.55)	< .0001	0.68 (0.46, 1.00)	.0488	0.60 (0.43, 0.85)	.0037	0.31 (0.15, 0.63)	.0013	0.50 (0.42, 0.60)	< .0001	0.52 (0.42, 0.66)	< .0001
Perceived Prevalence of Substance Use												
Multiple substance scale[4]	6.86 (6.06, 7.76)	< .0001	4.57 (3.60, 5.81)	< .0001	5.32 (4.12, 6.87)	< .0001	7.105 (4.11, 12.09)	< .0001	6.40 (5.58, 7.35)	< .0001	6.35 (5.51, 7.31)	< .0001
Marijuana	5.46 (4.91, 6.06)	< .0001	3.61 (2.98, 4.38)	< .0001	4.83 (3.86, 6.05)	< .0001	4.70 (3.07, 7.12)	< .0001	4.70 (4.21, 5.25)	< .0001	5.09 (4.50, 5.75)	< .0001
Academic Performance	1.84 (1.72, 1.96)	< .0001	1.56 (1.29, 1.88)	< .0001	1.94 (1.63, 2.30)	< .0001	2.42 (1.72, 3.41)	< .0001	1.77 (1.62, 1.93)	< .0001	1.90 (1.75, 2.06)	< .0001
Exposure to Prevention Messages in School (Yes vs. No)	0.59 (0.51, 0.67)	< .0001	0.87 (0.62, 1.22)	.4132	0.55 (0.41, 0.74)	.0001	0.82 (0.45, 1.49)	.5180	0.60 (0.52, 0.70)	< .0001	0.66 (0.56, 0.79)	< .0001

OR = odds ratio; CI = confidence interval.

[1] Includes those other than whites, blacks, and Hispanics (i.e., Asians, American Indians or Alaska Natives, Native Hawaiians or other Pacific Islanders).

[2] The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.

[3] ORs are based on separate logistic regression models of past year marijuana use for each of the factors, run separately for each of the categories of race/ethnicity and gender. ORs have not been adjusted for demographic differences. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.

[4] Multiple substance scales take the mean of responses for marijuana, cigarette, and alcohol use.

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1999.

Table B.5   Adjusted Odds Ratios (Controlling for Demographics) and Confidence Intervals (95 Percent) of School Domain Risk and Protective Factors and Past Year Use of Marijuana among Youths Aged 12 to 17, Using Adjusted Sample Weights: 1999

School Domain[1]	Risk/Protective Factor	Odds of Past Year Marijuana Use		
		Adjusted OR[2]	*p* value	95% CI
Commitment to School	Protective	0.46	<.0001	(0.43, 0.50)
Sanctions Against Substance Use at School	Protective			
Multiple substance scale[3]		0.43	<.0001	(0.37, 0.50)
Illegal drugs		0.60	<.0001	(0.51, 0.70)
Perceived Prevalence of Substance Use	Risk			
Multiple substance scale[3]		4.77	<.0001	(4.26, 5.35)
Marijuana		4.07	<.0001	(3.72, 4.46)
Academic Performance	Risk	1.78	<.0001	(1.66, 1.90)
Exposed to Prevention Messages in School	Protective	0.77	<.0001	(0.68, 0.87)

OR = odds ratio; CI = confidence interval.

[1] The questions used to measure each of the factors are provided in Appendix A (Table A.4). The coding and distribution of the responses for each factor are provided in Table 2.4.
[2] ORs are derived from multiple logistic regression models adjusted for age, gender, race/ethnicity, number of parents in home, household income, county type, and geographic region. ORs are based on separate logistic regression models of past year marijuana use for each of the factors. ORs > 1.0 indicate that the odds of past year marijuana use increased with each unit increase in the predictor. For risk factors, each unit increase in the predictor generally indicates an increased risk of marijuana use. For protective factors, each unit increase in the predictor generally indicates a higher level of protection against marijuana use.
[3] Multiple substance scales take the mean of responses for marijuana, cigarettes, and alcohol.

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1999.

Appendix C: Distribution of Risk and Protective Factors and Substance Use, by Age and Gender

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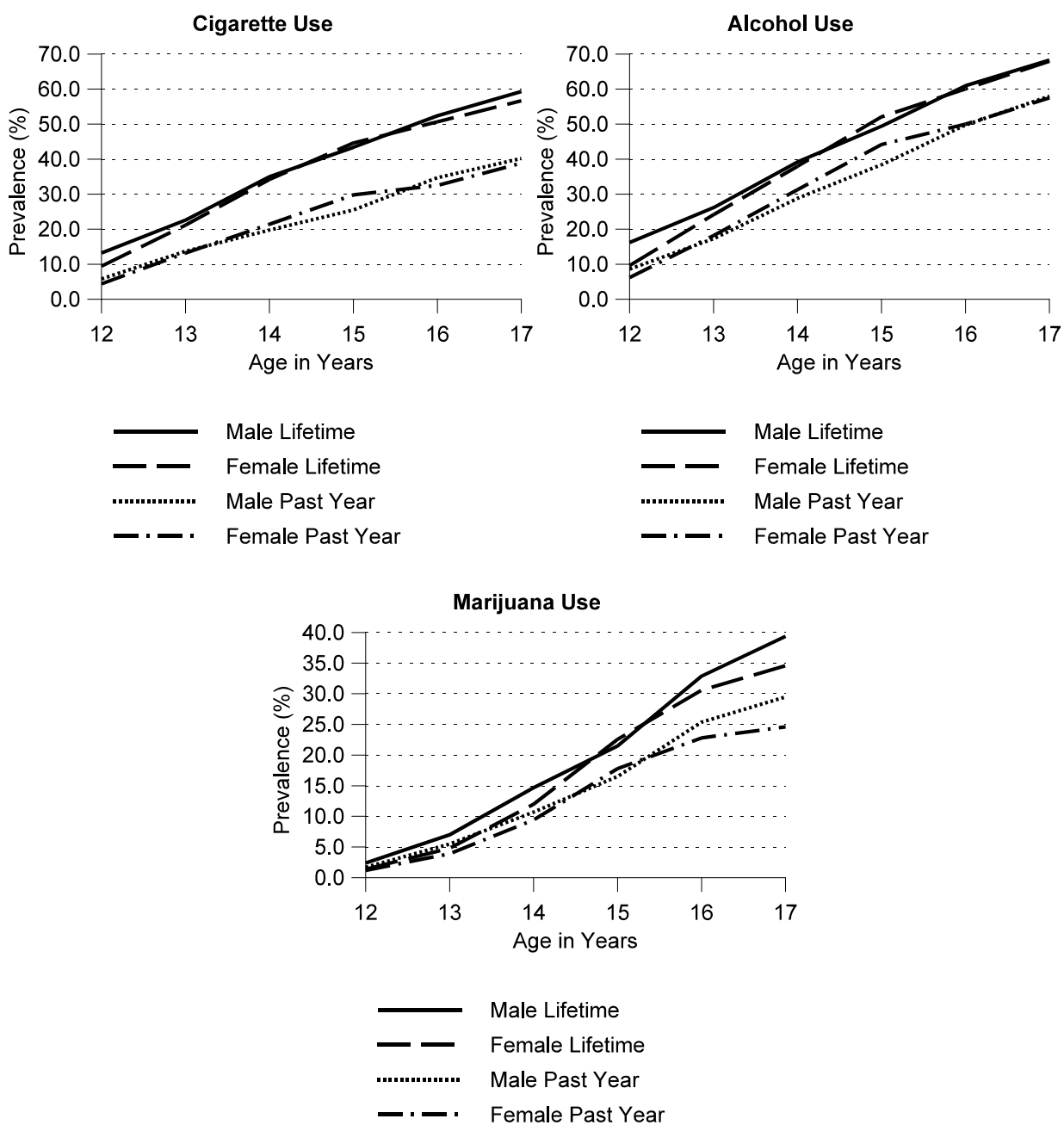
C.1   Substance Use, by Age and Gender

When examining any set of risk and protective factors relative to adolescent substance use, it is important to begin with an understanding of the ways in which substance use and other activities and relationships change with age. As mentioned in Chapter 2, behavior, especially substance-using behavior, can change rapidly during adolescence, and it can be potentially misleading to treat 12 to 17 year olds as an undifferentiated age group without closer inspection. The youth sample represented in the 1999 National Household Survey on Drug Abuse (NHSDA) can be thought of as six consecutive 1-year age groups.[33] Figure C.1 shows the association between age and substance use, separately for males and females, for three kinds of substances (i.e., cigarettes, alcohol, and marijuana) showing two distinct measures for each substance, namely, whether it was ever used during an individual's lifetime and during the past year. These calendrical categories are not exclusive: A person who used during the past year is included in the ever-used group.

According to the 1999 NHSDA, an estimated 13 percent of males and 9 percent of females who were 12 years old in 1999 had ever smoked a cigarette. But for those aged 17, these figures were about 59 percent for males and 57 percent for females. Although not shown, the percentage of youths who smoked within the past month, although much lower at every age, showed a very similar pattern, rising from about 2.1 percent at age 12 to about 28.7 percent at age 17, with only slight differences between males and females. The same pattern of steady increase with age and minimal differences between males and females was characteristic of alcohol use and marijuana use. Alcohol was used by the highest percentage of youths, closely trailed by cigarettes (with a somewhat flatter age distribution). The differences in the prevalence rates of these substances varied by year of age; for example, 12 year olds were approximately 5 times more likely to have used alcohol in the past year (7.4 percent) than to have used marijuana (1.5 percent), but among 17 year olds the rate of past year alcohol use (58 percent) was only twice as high as the rate of past year marijuana use (27 percent).

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[33] Because the survey data were collected continuously throughout the year and age is determined as age at the time of interview, individuals who were 12 years old at the time of the survey can be separated in birth date by as much as 2 years. That is, an individual born in late January 1986 could be interviewed at 12 years of age in early January 1999; and an individual born nearly 2 years later in mid-December 1987 could be interviewed at 12 years old in late December 1999. The age groups are therefore not clean successive birth cohorts. In addition, although there are differences in substance use by birth cohort, these differences are, for the measures used in this discussion, overshadowed by the degree of change associated with age alone.

Figure C.1   Prevalence of Lifetime and Past Year Substance Use in the U.S. Civilian, Noninstitutionalized Population Aged 12 to 17, by Age and Gender: 1999

Cigarette Use

Alcohol Use

——— Male Lifetime
— — Female Lifetime
············· Male Past Year
—·—· Female Past Year

——— Male Lifetime
— — Female Lifetime
············· Male Past Year
—·—· Female Past Year

Marijuana Use

——— Male Lifetime
— — Female Lifetime
············· Male Past Year
—·—· Female Past Year

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

This pattern of steadily increasing drug use at each age, with relatively small if any differences between males and females, was common to youths who were white, black, or Hispanic, as well as youths in the "other" category. White youths reported higher rates of cigarette smoking than other racial/ethnic groups, and black youths reported generally lower prevalence of alcohol use (see Table 3.1 in Chapter 3). White and Hispanic youths also reported higher rates of past year marijuana use than blacks or youths in the "other" category.

C.2   Risk and Protective Factors: Variation by Age

As is the case with the prevalence of substance use, the distributions of risk and protective factors also vary by age. As an illustrative example, Figure C.2 displays the percentage of youths who reported that they would strongly disapprove if a same-aged youth were to try marijuana once or twice, smoke one or more packs of cigarettes a day, or have one or two drinks of an alcoholic beverage nearly every day. The percentage of youths who would strongly disapprove of same-aged youths using these substances was notably higher among 12 year olds (86 percent for trying marijuana, 82 percent for daily smoking, and 83 percent for daily alcohol use) than for 17 year olds (48 percent for trying marijuana, 54 percent for daily smoking, and 53 percent for daily alcohol use). Youths aged 12 or 13 were more likely to strongly disapprove of trying marijuana once or twice than of daily cigarette smoking or alcohol use, but this pattern was reversed among youths aged 16 or 17. Many other risk and protective factors, particularly factors specific to substance use (e.g., community norms toward youth substance use, parental attitudes toward youth substance use, friends' use of substances, prevalence of substance use in school) showed similar patterns of gradual change for each age group.

The associations between risk and protective factors and youth substance use also can vary by age. The association between youth marijuana use and attending a special alcohol/drug education course taught by someone other than a regular teacher serves as an example. In 1997, 38 percent of youths aged 12 to 17 who had been enrolled in school had attended a special alcohol/drug education course taught by someone other than a regular teacher in the past year. Youths who had taken such a course were less likely to have used marijuana in the past year (11 percent) than those who had not taken one (19 percent). Therefore, one might conclude that attending these special courses was associated with a reduction in the prevalence of marijuana use among youths aged 12 to 17. However, looking at the results by single year of age, the special courses may be effective for ages 12 to 15, but not for ages 16 and 17 (Figure C.3). One possible reason for this is that special courses designed for younger youths may be aimed at prevention of substance use among nonusers, whereas special courses designed for older youths may be aimed to treatment among youths who already have initiated use.

Because of these differences between ages in the risk and protective factors and in the prevalence of substance use, age was included as a covariate in the prediction models presented in Chapter 4 of this report. By including age as a covariate, these models adjust for the differences between age groups in the risk and protective factors and the prevalence of substance use.

Figure C.2   Percentages of Youths Aged 12 to 17 Reporting Strong Disapproval of Same-Aged Youths Using Marijuana, Cigarettes, and Alcohol, by Age: 1999

Legend:
— Trying Marijuana Once or Twice
– – Smoking 1 or More Packs of Cigarettes a Day
· · · · · · Having 1 or 2 Drinks of an Alcoholic Beverage Nearly Every Day
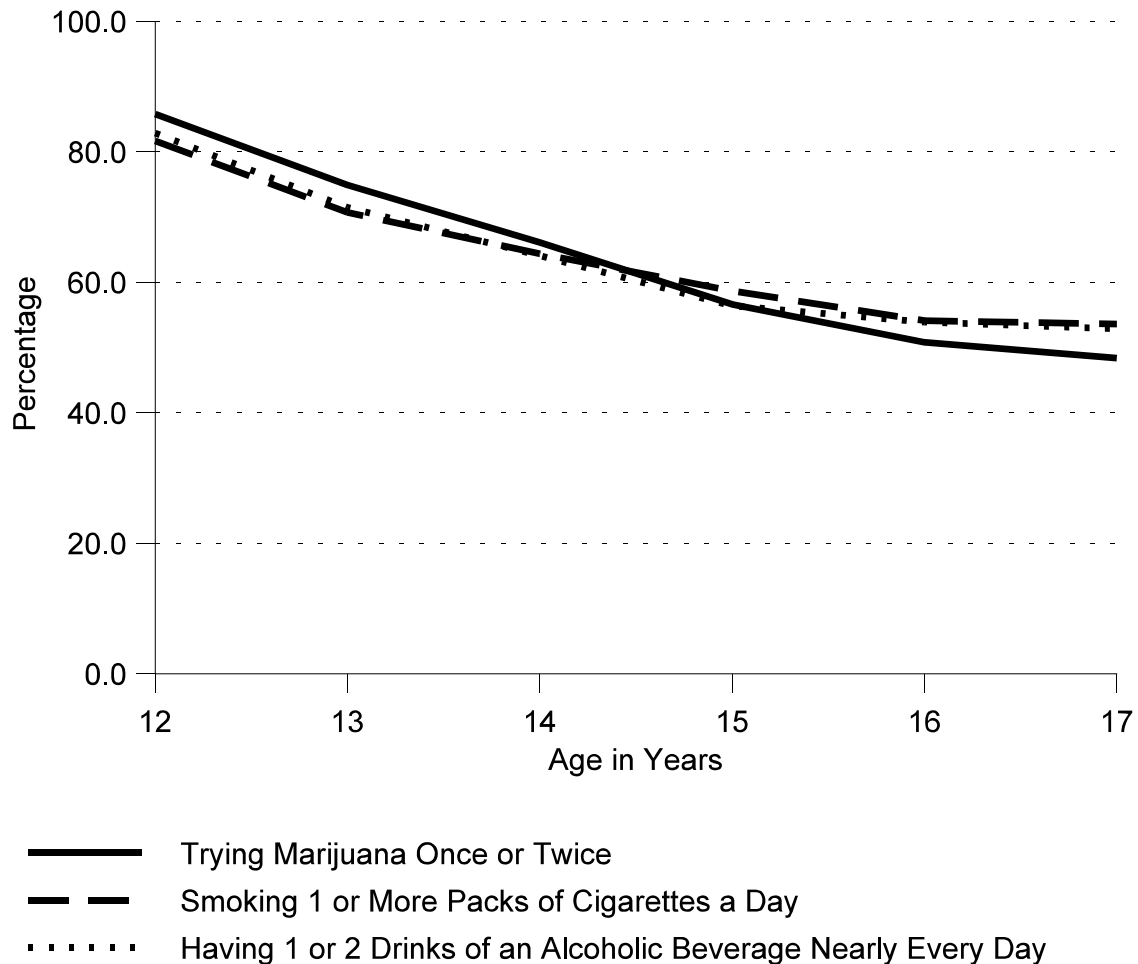
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Figure C.3 Percentage of Youths Reporting Past Year Marijuana Use, by Age and by Whether or Not Youths Had a Special Course on Drug Education Taught by a Special Teacher: 1997
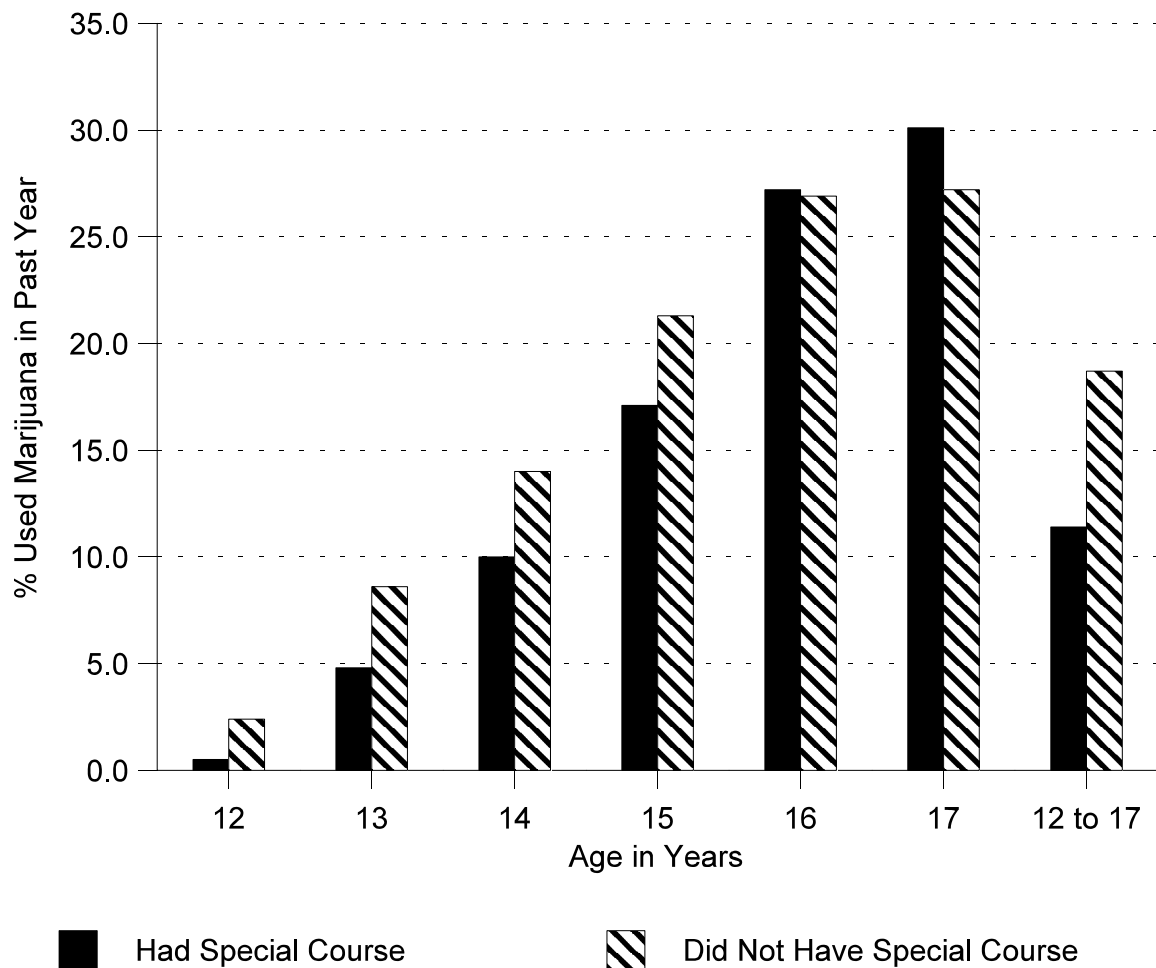
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997.

Appendix D: Methodological Changes Between the 1997 and 1999 NHSDAs

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As mentioned in Chapter 1, the National Household Survey on Drug Abuse (NHSDA) was administered using computer-assisted interviewing (CAI) methods for the first time in 1999. To assess the impact of this change in data collection mode, the 1999 survey utilized a dual-sample design. In addition to the 66,706 individuals interviewed using the CAI method, 13,809 individuals completed the same questionnaire using a paper-and-pencil interviewing (PAPI) methodology. Because of this methodological consistency with previous years of the survey, the 1999 PAPI sample was designed to be the main basis for relating 1999 drug use estimates to estimates from 1998 and prior years. Even though it was implemented within the sampling frame for the 50-State sample designed for the CAI survey, an extra stage of sampling and a within-household screening procedure were added to allow coordinated oversampling of the Hispanic and black households in a manner comparable with the 1998 and prior years' surveys. Weighting, editing, and imputation procedures were also conducted in a manner comparable with prior years' surveys.

In spite of the efforts taken to maintain total methodological comparability, analyses have suggested that the 1999 PAPI data may not be comparable with earlier data. Investigations into possible technical problems related to data collection, response rates, Quarter 1 start-up problems, weighting, and editing and imputation were conducted to see whether any procedural changes or errors may underlie the problem. Although no technical problems or obvious causes associated with these factors have been discovered, one line of inquiry within this general investigation was to investigate possible interviewer experience effects.

It was discovered that respondents were more likely to report substance use in interviews conducted by inexperienced interviewers than with experienced interviewers. This was exhibited in a small difference in predicted prevalence rates based on prior NHSDA experience and a continuing small, but often statistically significant decline in predicted prevalence rates as interviewers accumulated experience during the year. Under continuing operations with about the same level of effort from year to year, the experience of interviewers would be approximately matched for 2 succeeding years causing both years' estimates to be influenced in comparable ways. Because of the expansion of the sample in 1999, the interviewers in 1999 were generally less experienced than in prior years. Analytical studies that took account of the differences in interviewer experience distributions showed that under comparable conditions, the 1999 estimates would be lower than shown by the direct estimates. Initial analysis of the CAI sample indicates much smaller interviewer experience effects. This tends to validate the decision to move to the CAI technology as a means of reducing survey errors associated with the interviewing environment.

The prevalence of past year marijuana use among youths from the 1997 PAPI, the 1999 CAI, the 1999 PAPI, and the 1999 PAPI after adjusting for field interviewer experience are presented in Exhibit 5.1 in Chapter 5. A comparison of the 1997 PAPI and comparable 1999 PAPI (adjusted) estimates clearly shows that the prevalence rate for youth use of marijuana declined over these 2 years. All other comparisons between 1997 and 1999 in Chapter 5 are based on the adjusted 1999 PAPI data.

**Appendix E: Comparison of Similar But Not Identical Items
Included in the 1997 and 1999 NHSDAs**

Appendix E: Comparison of Similar But Not Identical Items Included in the 1997 and 1999 NHSDAs

E.1   Introduction

As mentioned in Chapter 5, comparisons made between the risk and protective factors of youth substance use in the 1997 and 1999 National Household Surveys on Drug Abuse (NHSDAs) are limited to factors included in both years of the survey. Chapter 5 includes analyses of change between 1997 and 1999 in 11 questions that were directly comparable between the 2 years. In addition, another set of questions related to risk and protective factors of youth substance use and included in both 1997 and 1999 underwent improvements in the wording or the response options between the 2 years. Because of these alterations to the questions, it is difficult to determine whether observed changes in responses to these questions between 1997 and 1999 can be attributed to real changes in the factors or to the changes in the questions. However, examining the overall trends in the direction of change between 1997 and 1999 in these variables may be instructive in helping to understand the reduction in marijuana use between those 2 years.

This appendix describes a set of questions included in both the 1997 and 1999 NHSDAs that had differences in wording or response options between those 2 years. First, the set of variables is described, including an explanation of how they changed between 1997 and 1999. Next, comparisons are made between the 1997 and 1999 surveys in the distributions of these questions and the associations between the questions and past year marijuana use. Finally, there is a discussion of the amount of variation in youth past year marijuana use that can be accounted for by this set of questions when combined with the set of demographic variables and the 11 questions that were directly comparable between the 2 years of the survey. As was the case in Chapter 5, all comparisons presented in this appendix are between 1997 paper-and-pencil interviewing (PAPI) data and 1999 PAPI data that have been adjusted for field interviewer (FI) experience.

E.2   Similar But Not Identical Questions Included in the 1997 and 1999 NHSDAs

Table E.1 presents seven questions related to risk and protective factors of youth substance use that were similar but not identical between the 1997 and 1999 surveys. These include questions about parental communication about the dangers of substance use, parental attitudes toward youth smoking, friends' use of marijuana, friends' use of alcohol, participation in gang fights in the past year, number of times attended religious services in the past year, and

grades in school in the last completed semester. Differences in the wording or response options between the 2 years of the survey are shown in italics in Table E.1.

For the question on parental communication about the dangers of substance use, youths in 1997 were asked, "During the past 12 months, have you spoken with *a parent or other adult* about the dangers of alcohol or drug use?" In 1999, youths were asked, "During the past 12 months, have you talked with *at least one of your parents* about the dangers of tobacco, alcohol, or drug use?" The 1997 question asks about communication with parents or other adults and asks only about communication regarding the dangers of alcohol and drug use. The 1999 question asks only about communication with parents and also includes communication about the dangers of tobacco use.

For the question on parental attitudes toward youth smoking, youths in 1997 were asked, "How *would* your parents feel *if they thought* you smoked *1 or more* packs of cigarettes per day?" In 1999, youths were asked, "How *do you think* your parents would feel *about* you smoking *1 or 2* packs of cigarettes per day?" However, the more notable change was in the response options. In 1997, the response options were (1) *Very upset*, (2) *Somewhat upset*, or (3) *Not at all upset*, whereas in 1999 the response options were (1) *Strongly disapprove*, (2) *Somewhat disapprove,* or (3) *Neither approve nor disapprove*. This change makes comparisons of the two questions difficult because it is possible that youths may have believed that their parents would *disapprove* of their smoking but would not become *upset* by it.

For the question on friends' use of marijuana, youths in 1997 were asked, "How many of your *close* friends have *tried marijuana once or twice*?" Youths in 1999 were asked, "How many of your friends *would you say use marijuana or hashish*?" The 1997 question asks whether *close* friends *trying* marijuana, which implies occasional use. The 1999 question talks about a broader group of friends (not just close friends) *using* marijuana or hashish, which implies a more regular usage. The response options in 1997 were (1) None of them, (2) A few of them, or (3) Most of them. In 1999, an additional response option of ("All of them") was added. For the purposes of the comparisons made between these questions in this report, the responses "Most of them" and "All of them" from the 1999 survey were combined.

For the question on friends' use of alcohol, youths in 1997 were asked, "How many of your *close friends* have had *5 or more drinks once or twice* a week?" Youths in 1999 were asked, "How many of your *friends would you say get drunk at least once* a week?" The 1999 question asks about a broader group of friends (not just close friends), and asks about "getting drunk" (rather than about having five or more drinks) at least once a week (rather than once or twice a week). The response options were the same as for the question on friends' use of marijuana.

For the question on participation in a gang fight, youths in 1997 were asked, "During the past 12 months, how many times have you gotten into a gang fight?" Youths in 1999 were asked "During the past 12 months, how many times have you *taken part in a fight where a group of your friends fought against another group?*" The response options in 1997 were (1) 0 times, (2) 1 or 2 times, (3) *3 or 4 times,* or (4) *5 or more times*, whereas in 1999 the response options were (1) 0 times, (2) 1 or 2 times, (3) *3 to 5 times,* (4) *6 to 9 times,* or (5) *10 or more times*. For the purposes of the comparisons made between these questions in this appendix, the responses for both years were coded as (1) 0 times, (2) 1 or 2 times, or (3) 3 or more times.

For the question on attending religious services, youths in both 1997 and 1999 were asked how often they had attended religious services in the past 12 months. The response options in 1997 were (1) *Never,* (2) *About once or twice,* (3) *About once or twice a month,* (4) *Attended every week,* or (5) *Attended several times a week*, whereas in 1999 the response options were (1) *0 to 5 times,* (2) *6 to 24 times,* (3) *25 to 52 times,* or (4) *More than 52 times*. For the purposes of the comparisons made between these questions in this appendix, the responses for both years were coded as (1) About once or twice a month or less (1997) / 0 to 24 times (1999) or (2) Attended once a week or more (1997) / Attended 25 or more times (1999).

For the question on academic performance, youths in both 1997 and 1999 were asked to report their grades for the last semester or grading period that they completed. The response options in 1997 were (1) *Mostly A's or B's,* (2) *Mostly B's or C's*, (3) *Mostly C's or D's*, or (4) *Mostly D's or below*, whereas in 1999 the response options were (1) *A+, A, A- average*; (2) *B+, B, B- average;* (3) *C+, C, C- average* (1999); or (4) *D or less than D average*. For the purposes of the comparisons made between these questions in this appendix, the responses for both years were coded as (1) Mostly C's or D's or better (1997) / C+, C, C- average or better (1999), or (2) Mostly D's or below (1997) / D or less than D average (1999).

E.3   Comparison of the Distributions of Factors in 1997 and 1999

Table E.2 presents the percentages of youths who selected each response category in both 1997 and 1999, as well as a test of whether the differences in responses between the 2 years are statistically significant (values of $p < .05$). There were significant differences between the distributions for each of the seven questions that were similar but not identical between 1997 and 1999. As mentioned earlier, the differences in the wording or response options of these questions between the 1997 and 1999 surveys prevents any meaningful interpretation of these differences for the individual questions.

For example, a higher percentage of youths in 1999 reported that their parents would strongly disapprove if they were to smoke one or more packs of cigarettes a day (89.4 percent)

than reported in 1997 that their parents would be very upset if they smoked one or two packs of cigarettes a day (81.2 percent). One explanation for this is that there was a real change in youths' perceptions of how their parents would feel if they were daily smokers. A second explanation is that some youths may have believed that their parents might strongly disapprove of youth smoking without getting very upset about it. Both explanations are consistent with the pattern of change, so neither can be ruled out as the cause of the change.

Despite the difficulty in interpreting the reason for the changes for each individual question, the overall pattern of change across the set of seven questions may be helpful in understanding why youth marijuana use decreased from 1997 to 1999. The direction of the change for six of the seven questions was consistent with the decrease in youth marijuana use. Compared with youths in 1997, youths in 1999 were more likely to have talked with parents/other adults about the dangers of substance use, reported a stronger negative reaction from parents if they were to smoke regularly, had fewer friends who used marijuana or drank alcohol heavily, participated less in gang or group fights, and had higher academic performance. Youths in 1999 also reported attending religious services less often than youths in 1997, which is not consistent with the drop in marijuana use between those 2 years.

E.4 Comparison of the Associations with Marijuana Use in 1997 and 1999

Table E.3 presents the associations with past year marijuana use of the questions that were similar but not identical between the 1997 and 1999 surveys, as well as a test of whether the differences in associations between the 2 years were statistically significant (values of $p <$ .05). Significant differences in the associations between the 2 years were found for parental reaction to youth smoking and taking part in a gang fight in the past year. In both cases, the associations were weaker in 1999 compared with 1997. As was the case with the differences in the distributions of these items discussed above, the differences in the wording of these questions prevents a meaningful interpretation of the differences in the strengths of these associations.

For example, one explanation for the lower association seen in 1999 between past year marijuana use and parental disapproval of youth smoking compared with the association seen in 1997 between past year marijuana use and parents being upset about youth smoking is that parental reaction to youth smoking was not as predictive of youth marijuana use in 1999 as it was in 1997. A second explanation is that youths' perceptions that parents would disapprove of their smoking were not as good of a predictor of their marijuana use as were youths' perceptions that their parents would be upset about their smoking. However, the pattern of smaller associations between risk and protective factors and past year marijuana use in 1999 than in 1997 was consistent with the general trend discussed in Chapter 5.

E.5 Comparison of the Predictiveness of the Items Included in Both 1997 and 1999

In Chapter 5, prediction models were presented for both the 1997 and 1999 NHSDAs that included a set of demographic variables (age, gender, and race/ethnicity) as well as the set of 11 questions that were directly comparable between the 2 years of the survey. Those results indicated that the 1997 model accounted for a higher percentage of the variation in past year marijuana use (53 percent) than the 1999 model (47 percent).

Table E.4 presents these same prediction models after the addition of the set of seven questions that were similar but not identical between the 2 years of the survey. In this table, the set of demographic variables is included first, followed by the set of 11 questions that were directly comparable between 1997 and 1999, and finally the set of questions that were similar but not identical between the 2 years of the survey. The addition of the set of similar but not identical items increased the amount of variance accounted for by both the 1997 model ($R^2 = 0.35$; $R_N^2 = 0.59$) and the 1999 model ($R^2 = 0.31$; $R_N^2 = 0.56$). These results indicate that the 1997 model still accounts for more overall variation in youth past year marijuana use compared with the 1999 model, but that the "gap" between the two models was reduced with the addition of the variables that were similar but not identical between the 2 years of the survey.

Table E.1 Comparison of Question Wording and Response Options of Risk and Protective Factor Questions Measured Using Similar But Not Identical Questions Between the 1997 and 1999 NHSDAs

Question / Construct	1997 NHSDA	1999 NHSDA
Parents Communicate about Substance Use	*During the past 12 months, have you spoken with a parent or other adult about the dangers of alcohol or drug use?* ● Yes ● No	*During the past 12 months, have you talked with at least one of your parents about the dangers of tobacco, alcohol, or drug use?* ● Yes ● No
Parents' Attitude Toward Substance Use	How *would* your parents feel *if they thought* you smoked *1 or more* packs of cigarettes per day? ● *Not at all upset* ● *Somewhat upset* ● *Very upset*	How *do you think* your parents would feel *about* you smoking *1 or 2* packs of cigarettes per day? ● *Neither approve nor disapprove* ● *Somewhat disapprove* ● *Strongly disapprove*
Friends' Marijuana Use	How many of your *close friends* have *tried marijuana once or twice?* ● None of them ● A few of them ● Most of them	How many of your *friends* would you say *use marijuana or hashish*? ● None of them ● A few of them ● Most of them ● *All of them*
Friends' Alcohol Use	How many of your *close friends* have had *5 or more drinks* once or twice a week? ● None of them ● A few of them ● Most of them	How many of your *friends would you say get drunk at least* once a week? ● None of them ● A few of them ● Most of them ● *All of them*
Took Part in Gang Fight	During the past 12 months, how many times *have you gotten into a gang fight?* ● 0 ● 1 or 2 times ● *3 or 4 times* ● *5 or more times*	During the past 12 months, how many times have you *taken part in a fight where a group of your friends fought against another group?* ● 0 ● 1 or 2 times ● *3 to 5 times* ● *6 to 9 times* ● *10 or more times*
Religiosity	During the past 12 months, how often did you attend religious services? Please do not include special occasions such as weddings, christenings, funerals, or other special events in your answer. ● *Never* ● *About once or twice* ● *About once or twice a month* ● *Attended every week* ● *Attended several times a week*	During the past 12 months, how many times did you attend religious services? Please do not include special occasions such as weddings, christenings, funerals, or other special events in your answer. ● *0 to 5 times* ● *6 to 24 times* ● *25 to 52 times* ● *More than 52 times*
Academic Performance	What were your grades for the last semester or grading period that you completed? ● *Mostly A's or B's* ● *Mostly B's or C's* ● *Mostly C's or D's* ● *Mostly D's or below*	What were your grades for the last semester or grading period that you completed? ● *A+, A, or A-minus average* ● *B+, B, or B-minus average* ● *C+, C, or C-minus average* ● *D or less than a D average*

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

Table E.2 Comparison of Distributions of Risk and Protective Factor Variables Measured Using Similar But Not Identical Questions Between the 1997 and 1999 NHSDAs

Variable	1997 %	1999 %	Test of Difference Between 1997 and 1999 X^2	p value
Family Domain				
Communication About Substance Use in Past Year				
Not spoken with parent/other adult (1997) / parent (1999)	45.5	40.9	5.42	.0207
Spoken with parent/other adult (1997) / Spoken with parent (1999)	54.5	59.1		
Parents' Reaction If Youth Smoked 1 or More Packs of Cigarettes Per Day?				
Very upset ('97) / Strongly disapprove ('99)	81.2	89.4	79.37	<.0001
Somewhat upset ('97) / Somewhat disapprove ('99)	14.2	5.2		
Not at all upset ('97) / Neither approve nor disapprove ('99)	4.6	5.4		
Peer/Individual				
Friends' Marijuana Use				
1997: How many of your close friends have tried marijuana once or twice?				
1999: How many of your friends would you say use marijuana or hashish?				
None of them	46.5	62.9	76.20	<.0001
A few of them	33.5	26.8		
Most of them ('97) / Most or all of them ('99)	20.0	10.3		
Friends' Alcohol Use				
1997: How many of your close friends had 5 or more drinks once or twice a week?				
1999: How many of your friends would you say get drunk at least once a week?				
None of them	56.2	67.3	29.37	<.0001
A few of them	29.2	24.1		
Most of them ('97) / Most or all of them ('99)	14.6	8.6		
Took Part in Gang Fight in Past Year				
1997: How many time have you gotten into a gang fight?				
1999: How many times have you taken part in a fight where a group of your friends fought against another group?				
0 times	92.1	86.6	34.34	<.0001
1 or 2 times	5.4	10.0		
3 or more times	2.5	3.4		
Number of Times Attended Religious Services in Past Year				
Never, once or twice, once or twice a month ('97) / 0 to 24 times ('99)	58.1	53.0	4.84	.0288
Every week, several times a week ('97) / 25 to 52 times, 52+ times ('99)	41.9	47.0		
School Domain				
Academic Performance				
Grades in Last Completed Semester				
Mostly A's and B's; mostly B's and C's; mostly C's and D's ('97) / A+, A, A-; B+, B, B-; C+, C, C- ('99)	93.8	97.3	14.86	.0001
D or below ('97) / D or below ('99)	6.2	2.7		

Note: The 1999 NHSDA data were derived from the 1999 PAPI, with weights adjusted for field interviewer experience.
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

Table E.3 Comparison of *Unadjusted Associations* with Past Year Marijuana Use of Risk and Protective Factors Measured with Similar But Not Identical Questions in the 1997 and 1999 NHSDAs

Variable	1997 NHSDA				1999 NHSDA				Test of Difference Between 1997 and 1999		
	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value	*t*-test value[1]	df	*p* value
Family Domain											
Communication about Substance Use in Past Year	0.14	1.16	(0.94, 1.42)	.1644	0.17	1.18	(0.82, 1.70)	.3648	0.11	1	.9127
1997: Spoken with a parent/other adult about the dangers of alcohol or drug use											
1999: Spoken with at least one parent about the dangers of tobacco, alcohol, or drug use											
Parents' Reaction If Youth Smoked 1 or More Packs of Cigarettes per Day	1.26	3.51	(3.09, 3.98)	<.0001	0.68	1.97	(1.51, 2.57)	<.0001	-3.90	1	.0001
Very upset ('97) / Strongly disapprove ('99)											
Somewhat upset ('97) / Somewhat disapprove ('99)											
Not at all upset ('97) / Neither approve nor disapprove ('99)											
Peer/Individual											
Friends' Marijuana Use	2.13	8.38	(7.32, 9.59)	<.0001	2.14	8.51	(6.41, 11.28)	<.0001	-0.10	1	.9237
1997: How many of your close friends have tried marijuana once or twice?											
1999: How many of your friends would you say use marijuana or hashish?											
None of them											
A few of them											
Most of them ('97) / Most or all of them ('99)											
Friends' Alcohol Use	1.16	3.18	(2.76, 3.65)	<.0001	1.20	3.33	(2.63, 4.21)	<.0001	0.34	1	.7374
1997: How many of your close friends had 5 or more drinks once or twice a week?											
1999: How many of your friends would you say get drunk at least once a week?											
None of them											
A few of them											
Most of them ('97) / Most or all of them ('99)											

Table E.3 (continued)

| Variable | 1997 NHSDA | | | | 1999 NHSDA | | | | Test of Difference Between 1997 and 1999 | | |
	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value	*t*-test value[1]	df	*p* value
Peer/Individual (continued)											
Took Part in Gang Fight in Past Year	1.11	3.02	(2.54, 3.59)	<.0001	0.74	2.10	(1.54, 2.87)	<.0001	-2.01	1	.0452
1997: How many times gotten into a gang fight?											
1999: How many times taken part in a fight where a group of your friends fought against another group?											
0 times											
1 or 2 times											
3 or more times											
Number of Times Attended Religious Services in Past Year	-1.02	0.36	(0.30, 0.44)	<.0001	-0.86	0.42	(0.29, 0.61)	<.0001	0.71	1	.4770
Never, once or twice, once or twice a month ('97) / 0 to 24 times ('99)											
Every week, several times a week ('97) / 25 to 52 times, 52+ times ('99)											
School Domain											
Academic Performance											
Grades in last completed semester	1.61	5.00	(3.41, 7.34)	<.0001	1.28	3.60	(1.94, 6.70)	.0001	-0.89	1	.3730
Mostly A's and B's; mostly B's and C's; mostly C's and D's ('97) / A+, A, A-; B+, B, B-; C+, C, C- ('99)											
D or below ('97) / D or below ('99)											

Note: The 1999 NHSDA data were derived from the 1999 PAPI, with weights adjusted for field interviewer experience.

[1] Significance tests indicate whether the interaction terms (Factor × Year) are significantly different from zero.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.

Table E.4 Comparison of *Adjusted Associations* with Past Year Marijuana Use of Risk and Protective Factors and Demographics Measured Using Identical or Similar Questions in the 1997 and 1999 NHSDAs

Identical / Similar But Not Identical Items	1997 NHSDA				1999 NHSDA			
	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value
Demographics: Identical								
Age (15 to 17 vs. 12 to 14)	0.70	2.01	(1.49, 2.71)	<.0001	0.91	2.48	(1.17, 5.24)	.0178
Gender (males vs. females)	0.26	1.30	(0.96, 1.76)	.0889	0.07	1.07	(0.64, 1.79)	.7897
Race/ethnicity								
Black vs. white	-0.26	0.77	(0.53, 1.10)	.1517	-0.02	0.98	(0.50, 1.92)	.9519
Hispanic vs. white	-0.07	0.93	(0.61, 1.43)	.7348	0.04	1.04	(0.56, 1.94)	.8988
Other vs. white	0.64	1.90	(1.06, 3.40)	.0325	0.53	1.70	(0.70, 4.12)	.2382
Community Domain: Identical								
Availability of Marijuana	0.47	1.60	(1.38, 1.86)	<.0001	0.51	1.67	(1.31, 2.13)	<.0001
Approached by Drug Seller in Past 30 Days (yes vs. no)	1.08	2.95	(2.11, 4.13)	<.0001	0.47	1.60	(0.91, 2.81)	.1047
Family Domain: Identical								
Communication about Substance Use in Past Year	-0.29	0.75	(0.53, 1.06)	.1017	-0.47	0.63	(0.34, 1.15)	.1324
Parents as Source of Social Support (yes vs. no)	-0.46	0.63	(0.47, 0.85)	.0024	-0.05	0.95	(0.54, 1.67)	.8533
Peer/Individual Domain: Identical								
Perceived Risk of Marijuana Use								
Low risk of using marijuana once a month	0.42	1.53	(1.26, 1.86)	<.0001	0.20	1.22	(0.82, 1.82)	.3230
Low risk of using marijuana once or twice a week	0.53	1.69	(1.37, 2.09)	<.0001	0.60	1.83	(1.16, 2.88)	.0101
Risk-Taking Proclivity								
How often do you get a kick out of doing things that are a little dangerous?	0.28	1.33	(1.14, 1.54)	.0003	0.24	1.27	(0.90, 1.80)	.1715
How often do you test yourself by doing something a little risky?	-0.15	0.86	(0.72, 1.03)	.1054	0.15	1.16	(0.82, 1.63)	.3939
How often do you wear a seatbelt when you ride in the front passenger seat of a car?	-0.14	0.87	(0.75, 1.00)	.0474	0.21	1.23	(0.94, 1.61)	.1281
Religiosity								
My religious beliefs are a very important part of my life	0.21	1.23	(0.90, 1.69)	.1990	-0.35	0.70	(0.47, 1.06)	.0906
My religious beliefs influence how I make decisions in my life	-0.10	0.90	(0.66, 1.24)	.5333	-0.13	0.88	(0.60, 1.28)	.4922
It is important that my friends share my religious beliefs	-0.02	0.98	(0.80, 1.22)	.8781	0.03	1.04	(0.72, 1.49)	.8524

Table E.4 (continued)

Identical / Similar But Not Identical Items	1997 NHSDA				1999 NHSDA			
	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value
Family Domain: Similar But Not Identical								
Parents' Reaction If Youth Smoked 1 or More Packs of Cigarettes per Day?	0.48	1.62	(1.27, 2.07)	.0002	0.50	1.66	(1.10, 2.48)	.0151
Very upset ('97) / Strongly disapprove ('99)								
Somewhat upset ('97) / Somewhat disapprove ('99)								
Not at all upset ('97) / Neither approve nor disapprove ('99)								
Peer/Individual: Similar But Not Identical								
Friends' Marijuana Use	1.20	3.32	(2.65, 4.17)	<.0001	1.61	5.00	(3.00, 8.34)	<.0001
1997: How many of your close friends have tried marijuana once or twice?								
1999: How many of your friends would you say use marijuana or hashish?								
None of them								
A few of them								
Most of them ('97) / Most or all of them ('99)								
Friends' Alcohol Use	-0.08	0.92	(0.76, 1.12)	.4064	-0.41	0.66	(0.42, 1.05)	.0769
1997: How many of your close friends had 5 or more drinks once or twice a week?								
1999: How many of your friends would you say get drunk at least once a week?								
None of them								
A few of them								
Most of them ('97) / Most or all of them ('99)								

Table E.4 (continued)

Identical / Similar But Not Identical Items	1997 NHSDA				1999 NHSDA			
	β	Odds Ratio	95% CI	*p* value	β	Odds Ratio	95% CI	*p* value
Peer/Individual: Similar But Not Identical (continued)								
Took Part in Gang Fight in Past Year	0.24	1.27	(0.83, 1.96)	.2721	0.20	1.22	(0.78, 1.93)	.3784
1997: How many times gotten into a gang fight?								
1999: How many times taken part in a fight where a group of your friends fought against another group?								
0 times								
1 or 2 times								
3 or more times								
Number of Times Attended Religious Services in Past Year	-0.61	0.54	(0.40, 0.74)	.0002	-0.21	0.81	(0.45, 1.47)	.4902
Never, once or twice, once or twice a month ('97) / 0 to 24 times ('99)								
Every week, several times a week ('97) / 25 to 52 times, 52+ times ('99)								
School Domain: Similar But Not Identical								
Academic Performance	1.06	2.88	(1.58, 5.25)	.0007	0.16	1.17	(0.32, 4.25)	.8120
Mostly A's and B's; mostly B's and C's; mostly C's and D's ('97) / A+, A, A-; B+, B, B-; C+, C, C- ('99)								
D or below ('97) / D or below ('99)								
Sample size		6,066				2,417		
R^2 (see footnote 1)		0.35				0.31		
R_N^2 (see footnote 2)		0.59				0.56		

Note: The 1999 NHSDA data were derived from 1999 paper-and-pencil interviewing (PAPI), with weights adjusted for field interviewer experience.

[1] Cox and Snell (1989) R^2 is a measure of the fit of the model, defined as $1-[L(O)/L(\hat{\beta})]^{2/n}$, where $L(O)$ is the likelihood of the intercept-only model, $L(\hat{\beta})$ is the likelihood of the full model, and *n* is the sample size.

[2] Recognizing that the Cox and Snell R^2 reaches a maximum for models that depend on the value of the estimated percentage, Nagelkerke (1991) proposed dividing the Cox and Snell measure by the maximum. In this sense, R_N^2 measures the absolute percentage of variation explained by the model.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1997 and 1999.